Douglas Edward Fields

University of New Mexico

Personal Information:

Date of Birth:	July 2, 1963
Nationality:	U.S.A.
Work Phone:	(505) 277-1466
Home Phone:	(505) 239-8205
Email Address:	fields@unm.edu

Education:

Ph.D. in Physics	1991 **Indiana University,** Bloomington, Indiana
Dissertation Title:	*Intermediate Mass Fragment Production in Intermediate Energy Heavy-Ion Reactions*
M.S. in Physics	1988 **Indiana University,** Bloomington, Indiana
B.S. in Physics **Minor in Mathematics**	1984 **Tennessee Technological University,** Cookeville, Tennessee

Employment History:

August 2007 – present	**Associate Professor,** University of New Mexico
August 2006 – August 2007	**Assistant Professor,** University of New Mexico
August 2001 – August 2006	**Assistant Professor/RBRC Fellow,** University of New Mexico/RIKEN-BNL Research Center
October 1997 – August 2001	**Research Associate Professor,** University of New Mexico
August 1996 – August 2001	**Part-time Associate Instructor,** University of New Mexico

October 1995 – October 1997	**Postdoctoral Research Associate,** University of New Mexico
August 1992 - October 1995	**Postdoctoral Research Associate,** Los Alamos National Laboratory
January 1986 - August 1992	**Research Assistant,** Indiana University
June 1884 - January 1985	**Teaching Assistant,** Duke University
June 1984 - January 1985	**Research Assistant,** Duke University
January 1981 - June 1984	**Teaching Assistant,** Tennessee Technological University
June 1980 - August 1982	**Undergraduate Research Assistant,** Tennessee Technological University

Community Service:

August 1992 – August 1997	**Volunteer,** The Wildlife Center, Española, New Mexico
November 1993 - December 1995	**Volunteer Team Member,** Los Alamos Mountain Canine Corps Search and Rescue Team
April 1995 – March 1996	**Volunteer Firefighter,** La Massilla/San Pedro Volunteer Fire Department

Research Funding History

Strange Particles and Heavy-Ion Physics
PI: Bernd Bassalleck
Department of Energy
12/1/1995 - 11/30/1996
$263K

PHENIX Muon Tracking Station One
PI: Douglas E. Fields
PHENIX/Brookhaven National Laboratory (DOE/RIKEN)
10/1/1995 - 9/30/1996
$55K

Strange Particles and Heavy-Ion Physics
PI: Bernd Bassalleck
Department of Energy
12/1/1996 - 11/30/1997
$326K

PHENIX Muon Tracking Station One
PI: Douglas E. Fields
PHENIX/Brookhaven National Laboratory (DOE/RIKEN)
10/1/1996 - 9/30/1997
$174K

Strange Particles and Heavy-Ion Physics
PI: Bernd Bassalleck
Department of Energy
12/1/1997 - 11/30/1998
$336K

PHENIX Muon Tracking Station One
PI: Douglas E. Fields
PHENIX/Brookhaven National Laboratory (DOE/RIKEN)
10/1/1997 - 9/30/1998
$177K

Strange Particles and Heavy-Ion Physics
PI: Bernd Bassalleck
Department of Energy
12/1/1998 - 11/30/1999
$343K

PHENIX Muon Tracking Station One
PI: Douglas E. Fields
PHENIX/Brookhaven National Laboratory (DOE/RIKEN)
10/1/1998 - 9/30/1999
$274K

Strange Particles and Heavy-Ion Physics
PI: Bernd Bassalleck
Department of Energy
12/1/1999 - 11/30/2000
$343K

PHENIX Muon Tracking Station One
PI: Douglas E. Fields
PHENIX/Brookhaven National Laboratory (DOE/RIKEN)
10/1/1999 - 9/30/2000
$85.4K

Strange Particles and Heavy-Ion Physics
PI: Bernd Bassalleck
Department of Energy
12/1/2000 - 11/30/2001
$350K

PHENIX Muon Tracking Station One
PI: Douglas E. Fields
PHENIX/Brookhaven National Laboratory (DOE/RIKEN)
10/1/2000 - 9/30/2001
$194K

Strange Particles and Heavy-Ion Physics
Co-PI: Bernd Bassalleck, Douglas E. Fields
Department of Energy
12/1/2001 - 11/30/2002
$362K

PHENIX Muon Tracking Station One
PI: Douglas E. Fields
PHENIX/Brookhaven National Laboratory (DOE/RIKEN)
10/1/2001 - 9/30/2002
$12K

Strange Particles and Heavy-Ion Physics
Co-PI: Bernd Bassalleck, Douglas E. Fields
Department of Energy
12/1/2002 - 11/30/2003
$362K

Strange Particles and Heavy-Ion Physics
Co-PI: Bernd Bassalleck, Douglas E. Fields
Department of Energy
12/1/2003 - 11/30/2004
$357K

Strange Particles and Heavy-Ion Physics
Co-PI: Bernd Bassalleck, Douglas E. Fields
Department of Energy
12/1/2004 - 11/30/2005
$357K

Strange Particles and Heavy-Ion Physics
Co-PI: Bernd Bassalleck, Douglas E. Fields
Department of Energy
12/1/2005 - 11/30/2006
$357K

Strange Particles and Heavy-Ion Physics
Co-PI: Bernd Bassalleck, Douglas E. Fields
Department of Energy
12/1/2006 - 11/30/2007
$357K

Strange Particles and Heavy-Ion Physics
Co-PI: Bernd Bassalleck, Douglas E. Fields
Department of Energy
12/1/2007 - 11/30/2008
$357K

Strange Particles and Heavy-Ion Physics
Co-PI: Bernd Bassalleck, Douglas E. Fields
Department of Energy
12/1/2008 - 11/30/2009
$357K

Strange Particles and Heavy-Ion Physics
Co-PI: Bernd Bassalleck, Douglas E. Fields
Department of Energy
12/1/2009 - 11/30/2010
$357K

Strange Particles and Heavy-Ion Physics
Co-PI: Bernd Bassalleck, Douglas E. Fields
Department of Energy
12/1/2010 - 11/30/2011
$357K

Teaching and Advisement History

Doctoral Advisement:

Name	Thesis	PhD
Robert Hobbs	Orbital Angular Momentum of the Proton	May 2006
Jeongsu Bok	TBD	TBD
Aaron Key	TBD	TBD

Pre-Doctoral Advisement:

Name	Project	Period Advised
Steve Klinksiek	Prototype development of the Muon Tracker system, E866 at Fermilab single muon experiment	Summer 1996 – December 2005
Benji Lewis	Data taking for experiment E950 at the AGS	Summer 1999
Lori Sanfratello	Construction, installation and operation of Station One Muon Tracker, Analysis of charge asymmetry in Run02 data	Summer 2000 - Spring 2003
Anita Parmar	Construction, installation and operation of Station One Muon Tracker	Summer 2000 - Summer 2002
Sonya Daffer	Construction of Station One Muon Tracker	Summer 2000
Parizad Fatemi	Construction and installation of Station One Muon Tracker	Summer 2002
Michael Malik		
Katherine Spendier		

Undergraduate Student Mentoring:

Name	Project	Period Advised
Leslie Chavez	Design and prototyping Station One Muon Tracker	Summer 1996 - Summer 1998
Elizabeth Lockner	Construction of Station One Muon Tracker	Summer 1999, Summer 2000
Braunen Smith	Development and data taking for CE75 at IUCF	Summer 2000 - Spring 2003
John Grass	Software Development	Summer 2000 - Summer 2002
Raquel Fraga-Encinas	Construction of Station One Muon Tracker	Summer 2000

Dan Koehler	Construction, installation and operation of Station One Muon Tracker	Summer 2000 – Summer 2002
Jose Diaz	Construction, installation and operation of Station One	Summer 2002
Adam Pierson	Construction, installation and operation of Station One	Summer 2002
Lance Edans	Operation of MuTr, Testing silicon strip-pixel detectors	Summer 2004
Aaron Zimmerman	Testing silicon strip-pixel detectors at UNM	Summer 2005 – May 2009
Alexander Barron		Fall 2006 - Present
Michael Phillips		Fall 2009 - Present

Classroom Teaching:

Semester	Class Title	Class Call Number	Students
Fall, 1996	General Physics II	Physics 161	9
Fall, 1998	Introduction to Physics	Physics 102	57
Spring, 2000	General Physics II	Physics 161	10
Spring, 2000	Problems for General Physics II	Physics 168	8
Spring, 2002	General Physics II	Physics 161	24
Spring, 2002	Problems for General Physics II	Physics 168	10
Spring, 2002	Junior Laboratory II	Physics 308	7
Fall, 2002	General Physics I	Physics 160	128
Fall, 2002	Problems for General Physics I	Physics 167	20
Spring, 2003	Introduction to Subatomic Physics	Physics 450	13
Spring, 2004	General Physics II , Honors	Physics 161	18
Spring, 2004	Problems for General Physics II, Honors	Physics 168	12
Fall, 2004	Intermediate Quantum Mechanics I	Physics 491	21
Fall, 2005	Intermediate Quantum Mechanics I	Physics 491	18
Fall, 2006	General Physics I	Physics 160	140
Fall, 2006	Problems for General Physics I	Physics 167	20

Statement of Scholarly Professional Achievements and Future Goals

Research

The main physics goal of my research is to better understand the interactions and structure of the nucleus and of its components, the nucleons. Even though the size of a nucleus is quite small (~l x 10^{-14} m), the field of study is rich and diverse and includes the study of nuclear structure (why the table of isotopes looks the way it does); fusion and fission (how the forces that bind the nucleons together can be used to release energy from the nucleus); excited nuclei and nuclear decay (how the complex forces interact to set up unique energy levels that can transition between each other and release discreet quanta of energy); nuclear matter at high temperatures and densities (how the nuclear forces depend upon the state of the interacting particles); nucleon/hadron structure (how the nucleons themselves are made up of sub-particles called quarks and gluons and how this structure determines the progress of nuclear reactions); and finally quark and gluon structure of nucleons (how the complex nature of the nucleon substructure comes together to form a relatively simple nucleon). My research career has led me through many aspects of this field, presently taking me into the study of the nature of the intrinsic spin of the nucleons.

I attended undergraduate school at Tennessee Technological University, and since the physics department had no graduate program, many of the best undergraduates were hired as research assistants to the professors. I began to actively research nuclear physics at the age of 17 as an undergraduate summer researcher with one of our professors who did research at Florida State University. FSU had a low-energy (9MV) tandem Van de Graff accelerator capable of delivering intermediate mass beams (~12C). At the time, there was an incomplete understanding of the process when one nucleus is collided into another to form a compound nucleus (fusion). Experimental evidence suggested that there was a limitation on the probability that the compound nucleus would be formed. Whether that was a limitation based on some property of the compound nucleus, or a property of the colliding nuclei that formed it was to be determined. Our group ran and analyzed an experiment that compared the fusion probability between different "entrance channels". Our conclusion was that the fusion limitation was due to competition from another process, namely when the projectile nucleus breaks up and therefore does not completely fuse with the target nucleus[J1]. This wonderful experience as a young physics student motivates me strongly to include undergraduates in as many aspects of my research program as possible.

My graduate school research built upon my undergraduate research but at a somewhat higher energy, well above the threshold where the two nuclei involved could "fuse". The research was focused on how the nucleons in the beam were stopped in the target nuclei, how the energy was absorbed and distributed among the target nucleons, and then subsequently, how the compound nucleus de-excited back to a state of normal nuclear matter through particle emission. This research studied not only the probability for different process to occur, but also developed better techniques to understand the dynamics of these processes. At these energies, three main processes contribute to the interaction: I) projectile fragmentation where the incoming beam nucleus breaks up or picks up nucleons from the target nucleus and is detected in the forward (beam) direction with approximately the beam velocity; 2) non-equilibrium reactions that lead to particle emission preferentially in the forward direction, but with particle energies much lower than projectile fragmentation, indicative of emission from a thermal, fast-moving source; and 3) equilibrium reactions that emit isotropicly with energies that are consistent with complete, or nearly complete, fusion followed by thermal emission from a slow moving source[J2].

With increasing beam energies, competition between these processes along with their individual dynamics change, which led us to the conclusion that at higher energies, pion and resonant baryon production channels open resulting in much higher energy deposition on a fast time scale. This nuclear stopping leads to a fast heating and subsequent thermal expansion of the excited compound nucleus, eventually leading to the fast simultaneous breakup, or multi fragmentation of the nucleus[J8].

This picture was confirmed by other exclusive experiments performed by our group using more sophisticated techniques. One of these involved the detection of two protons from the same event to give information about the source size of the emitting system. This method, related to the Hanbury-Brown Twiss (HBT) method for measuring star size via the correlation between two-photon energies, confirmed that at higher energies, more of the incoming beam energy was stopped in the target nucleus, and the resulting excitation energy drove the nucleus to expand and fragment[J4,J6].

For my thesis experiment, another method to determine the amount of momentum and energy transfer to the target nucleus was used: employ a very heavy fissile target and measure the relative angle between the subsequent fission fragments after collision with the beam nucleus. This angle can determine the velocity of the compound nucleus (after collision and before fission) and thus the energy deposited. This experiment led to a picture of the interaction that was driven by the dynamics of the first scattering in the collision, and helped to refine the cascade model calculations for nuclear matter interactions.

Many new and interesting phenomena have been discovered by sheer accident, and I have been fortunate enough to be looking in the right place to see an unexpected mode of fission called ternary fission (simultaneous fission into two heavy, and one light daughter nuclei) as a by-product of my thesis work. Ignored as a background in earlier works, I characterized this emission in terms of the relation to the angle between the light fragment and the two fission fragments and with respect to the neutron excess of the light fragments. During the fission process, the compound nucleus undergoes an elongation to an ellipsoidal shape, and then a thinning in the central "neck" region between the two eventual fission fragments. This fission mode was determined to be highly excited from momentum transfer systematics, and was explained as an over-elongation and subsequent emission of a light fragment from the neck region. This work was published in Physical Review Letters, one of the most prestigious peer reviewed physics journals[J14].

Beginning in the first semester of my graduate school career, I was involved in of the experimental program both in our group and at IUCF. Because the experiments that took place were generally small (<12 people), I was involved in all aspects from designing and building detectors[J7], putting together the data acquisition electronics, data monitoring and data taking to data analysis and paper writing. I proposed my own thesis experiment and gave the proposal presentation to the Program Advisory Committee. I participated in no fewer than six experiments during my tenure there, and was exposed to a wide range of physics subjects and detector technology[J2-J16]. This experience has lead me to the belief that intense, experimental hands-on training is a must for graduate students in my field, and I presently attempt to maintain this high standard for the graduate student that I mentor.

After the completion of graduate school, I became involved in even higher energy nuclear reaction studies, this time at CERN, in Geneva, Switzerland as a post-doc with Los Alamos National Laboratory. The goal of this research program was to extend the energy dependence of the reaction dynamics into the regime where particle creation becomes the dominant source of matter detected from the nuclear interactions. At these energies, the nuclear forces between nucleons can no longer keep them separated during the collision and partons inside the nucleons (known as quarks and gluons) become the dominant source of interactions. The collisions between these partons tear the nucleons apart and create particle-antiparticle pairs as the incoming kinetic energy is transformed into matter.

The experiment I was involved with, NA44 at CERN used the HBT method using two-pion correlations to determine source characteristics of the emission from the hot source. I made several long trips to CERN to prepare the experiment, run data-taking shifts and to analyze data. I was put in charge of the two-pion correlation data group and organized a workshop, held at LANL, on the correlation data. The results from this work were published in several papers and brought a better understanding of the dynamics of the expansion of the heated nuclear matter[J23,J38]. However, as is often the case in such complicated systems, it was difficult to interpret the data without comparison to model predictions.

As a semi-independent effort, I ran a theoretical code that was used to model such collisions via the breakup of strong-force "strings" into pairs of particles and anti-particles. I worked with the theorist who wrote the code to make a prediction of the two-particle correlation results from the experiment. The agreement between the model prediction and the data was remarkable. Based on this result, the dynamics of the collision were studied in the model in order to understand, albeit in a model-dependent way, the experimental results. This work led to a first-author paper that discusses the trends in the data, and demonstrates the limitations of the HBT method[J24].

As part of the experimental program, I also worked with another researcher at LANL to develop a new and novel detector for use at NA44. Aerogel is a solid substance, made from silicon that has the lowest density of any known solid. It is semi-transparent, and has optical qualities that make it well suited as a Cherenkov radiating material. Together, we studied its optical qualities, wrote from scratch a light tracking code and designed the optics for an aerogel-based Cherenkov detector. These studies lead to several instrumental papers which are now the standard for the widespread use of aerogel in nuclear and particle physics experiments[J19,J21].

During my late post-doc years at Los Alamos, I became involved in the early stages of development for the PHENIX experiment[J39] at the Relativistic Heavy-Ion Collider (RHIC) at Brookhaven National Laboratory (BNL). This experiment was designed to extend the investigations of nuclear matter into the ultra high-energy regime, where it has been speculated that a new form of matter, called a quark-gluon plasma (QGP), may be created. This QGP was thought to have existed soon after the big bang, where the most fundamental particles moved independently of one another, much as electrons move independently in the hot highly excited region of normal plasma. As the universe expanded and cooled, the particles (quarks and gluons) were forced to conglomerate together to form hadrons (protons, neutrons, pions, etc.) that make up most of what we see in the universe today.

In order to understand what happens in the high energy-density environment of the nuclear collisions expected at RHIC, we began to study, through simulations, the emissions of heavy partons called charm quarks. In normal nuclear matter, these heavy quarks can combine with other anti-quarks to form mesons of a certain type. However, models of quark-gluon plasma have suggested that this combination process might be suppressed in the high energy-density environment created in the QGP. These simulation studies were presented at a collaboration meeting of the PHENIX experiment held in Santa Fe, New Mexico and influenced the design of the PHENIX muon subsystem.

As I became more involved with the muon subsystem of PHENIX, the opportunity arose to bring UNM into the collaboration by joining the physics department as a Research Staff member. This move brought the significant resources of UNM to bear on the development and construction of the PHENIX Muon Tracking chambers. We began by hiring several UNM students to work on the development work of the cathode strip chambers at LANL, and then spun this off at UNM where the actual prototyping and construction occurred. This was an extremely gratifying time for me as a researcher since, for the first time, I was able to teach and work with students in the laboratory environment.

During this time, I became interested in a new field of research, supported by the same experiment, but rather than investigating the QGP, would be investigating the nature of the spin of the nucleon[J40]. I felt that this was a natural progression of my research interests, as it led me from the structure of the nucleus to the structure of the partons inside the nucleon. Naive models of the nucleon had long held that the spin of a nucleon is derived from the spin of its constituent quarks. However, previous research at Stanford and CERN had shown that the quarks that compose a nucleon contribute a surprising small amount to the spin of their parent nucleon. In order to investigate this "Spin Crisis" as it became to be known, one needed to collide polarized protons, something that was previously beyond the scope of existing facilities. However, the Spin Crisis was considered an important enough problem that additional funds were allocated to RHIC to develop a polarized proton program.

In February 1997, I organized a RHIC Spin Physics conference in Española, New Mexico. This conference attracted nearly 25 experimentalist and theorists from around the world to discuss the physics opportunities opening with the new polarized RHIC facility. This meeting lay many of the foundations for the program that is just now reaping results.

In addition to the ongoing effort to build the muon tracking chambers, I led an effort to resolve the problematic issue of how to measure the beam polarization at RHIC. In order to measure a polarization, one needs to measure a production asymmetry (left-right for transversely polarized beams), and know the physics asymmetry, allowing a measurement to determine the polarization as a ration of those two. Unfortunately, when a new energy regime is being explored, little is known about either. However, theoretical guidance led us to two alternatives: a pion spectrometer and a proton-carbon recoil detector. The first option was rather expensive and had a relatively low figure of merit (combination of statistical significance and asymmetry), but the second option seemed experimentally difficult. From discussions about this problem, I became involved in the development of experimental strategies based upon my thesis experiment to prove the viability of the proton-carbon recoil polarimeter for RHIC.

My group then took the lead to develop the silicon based recoil detectors that would be suitable for such an experiment. A test run was proposed at my alma mater (IUCF) and successfully carried out. This was followed by a proposal for a run at the Brookhaven AGS. I was the co-spokesman for this experiment. This experiment, AGS E950, measured the asymmetry for polarized proton elastic scattering from a carbon ribbon target at 24GeV/c, measuring the analyzing power which has been used ever since as the basis for RHIC polarimetry. In fact, the RHIC polarimeters are basically the same design as was used for E950. In addition to an interesting physics paper[J53] and published thesis, this effort has been invaluable to the RHIC spin physics program, without which, there would be no measure of the beam polarization.

Concurrent with this work, the North and South tracking station one chambers were built, installed and commissioned. The South arm was operational in RHIC Run-02, and quickly gave a measurement of the J/Psi meson yield[J87], an important baseline measurement for the QGP studies in heavy-ions. This quick turn-around from data taking to physics results was aided by our group's (especially Nicki Bruner's) involvement in the simulation, calibration, and alignment of the South tracking arm. By the start of RHIC Run-03, both muon arms were operational and soon afterwards again yielded physics results. The repair and maintenance of the South arm, installation of the North arm and simultaneous data analysis of the Run-02 data was indeed a Herculean feat for all involved.

In addition to being the Detector Council representative for the Muon Tracking subsystem beginning in spring 2003, I was stationed at BNL during the Run-03 proton-proton running and was asked to serve the collaboration as the Spin Coordinator for the run. My job was to coordinate the many efforts that went into the polarized beam data taking, including coordinating with the other experiments, the Collider-Accelerator Department, and the various subsystems. As a result of this effort, I was asked to represent PHENIX at the Conference on Intersections between Particle and Nuclear Physics 2003, held in New York City in May. My talk, Spin Physics with PHENIX, was well received and I was asked to present it at the PHENIX collaboration meeting the following June. In fall and early spring of 2003, I was again stationed at BNL for most of my time, and participated in the analysis of the polarized Run-03 data, the preparation for RHIC Run04 and preparations for planned upgrades to PHENIX, including a >$10 million new silicon vertex detector.

In fall of 2003, we hired a new postdoctoral associate, Imran Younus, to be stationed for his first two years at BNL. Imran took on the task of working with the maintenance and operation of the muon tracking system. He has basically led that effort, implementing a new FPGA code in the front-end electronics that allowed the muon system to take data at a higher rate, suitable for the upgraded RHIC II luminosity. In addition, Imran has played a significant role in keeping the muon tracking system operational throughout the running periods, and fixing problems in the electronics during the summer shutdown periods.

I traveled again to BNL for an extended research semester in the spring of 2005. During this time, I tried to develop a new research field in collaboration with Imran Younus and our new Research Faculty, Jan Rak. Jan was already involved in the PHENIX experiment, and is considered an expert in the fields of jet physics. This expertise has played an important role in the development of this new research direction.

In the fall of 2004, I was trying to understand an experimental technique to determine the orbital angular momentum contribution from quarks and gluons (partons) to the spin of the nucleon. During this process, I came up with another idea of how to do this measurement. The idea was to measure pairs of particles coming from a hard collision at RHIC, and determine their net transverse momentum. If the partons have a transverse momentum which is correlated to the spin of the proton (orbital angular momentum), then the average transverse momentum of jets which result from the interacting partons should be different for different orientations of the proton's spin. This idea perfectly matched the expertise that Jan brought to our group, and we have been working together on this exciting research ever since.

We used this technique to study the early data from our experiment at RHIC. Robert Hobbs wrote his PhD thesis on the RHIC Run 3 data. It was given preliminary status, and although the statistics were very poor, there was some hint of a large effect.

Independently I worked with Jan in the writing of the paper on jet transverse motion in p+p collisions at RHIC from di-hadron correlations as a member of the paper preparation group (PPG) and the internal review committee (IRC). The paper was recently published in Physical Review D[Error! Reference source not found.].

In the spring of 2006, I organized a Workshop on Parton Orbital Angular Momentum, Jointly with Gerry Bunce and Werner Vogelsang, to get theorists in the field together with experimentalists to help define the state-of-the-art in the field and get feedback in our research effort. The workshop was very successful, and the proceedings were published by RBRC[O3].

We have recently been approved for preliminary status for our RHIC Run5 data analysis of the k_T asymmetry, and have shown our first results in the SPIN06 meeting in Kyoto, Japan. Again, with somewhat poor statistics, the results are consistent with our previous analysis and show a rather large effect. We are currently pursuing this analysis with the majority of our time, and are preparing a paper draft for collaboration review.

Also recently, I was asked to chair an internal review committee for the writing of another important paper for PHENIX. This service to the collaboration will lead soon to another publication[Error! Reference source not found.].

During my relatively long career, I have become an expert in many experimental nuclear and particle physics techniques. I have expertise in ion chamber E-delta-E telescopes, silicon detectors, aerogel Cherenkov detectors, and most recently cathode strip chambers. I would like to turn this detector expertise to good use in creating a detector development laboratory here at UNM, both as a resource for our physics groups and as a training ground for undergraduate and graduate researchers. It is my firm belief that research and teaching benefit strongly from each other, and must be considered as one goal. I believe that my record on undergraduate mentoring, as demonstrated below in the list of undergraduate students that have participated in my research, demonstrates my commitment to this goal.

Because of this belief, I have written several grant proposals in order to fund a Detector Development Laboratory here at UNM. Michael Gold and I wrote a proposal to the Research Allocations Committee, which was turned down. He and I then prepared another proposal to the Department of Defense, but we missed the deadline. Undaunted, I prepared a third proposal to the Defense Threat Reduction Agency as a first-round white paper. This white paper was accepted, went on to the final round where it was again accepted. This is now a University-wide open commitment from DTRA for up to $51 million.

Recently the effort to create a University of New Mexico Sensor Development Laboratory has been revived and I am currently in discussions with faculty in physics and nuclear engineering on how to proceed to realization.

Teaching

My teaching philosophy is centered on challenging even the best of students, while at the same time instilling in the "average" student a higher level of understanding and appreciation for the material. In order to accomplish this, one must have a clear picture of: 1) where the students are in their understanding of the background material, 2) what the students should be able to do at the end of the course, and 3) the best methods to bring them there from where they are. The relative difficulty of these separate tasks depends strongly on the type of course you are teaching and the preparedness of the students. Accomplishing these together is particularly difficult in the current UNM environment. I say this from my experience in the past years teaching at the introductory engineering physics classes, where the best of students are quite well prepared, while the average students are systematically under-prepared to the extent that basic high-school level mathematics is challenging. However, I do not point to this issue out of despair. Rather, I find it an interesting challenge, although it greatly increases the amount of work needed to teach. My approach has been to find ways to make sure that the students work in the course is efficient and effective.

For the same reason that I had the opportunity to do research at an early age, namely that my undergraduate school had no graduate program, I have also been teaching and developing teaching materials for a long time. I taught many quarters of physics laboratory as an undergraduate, and even helped in the development of our laboratory manual, complete with problems. This manual is still in use today[O1].

My first teaching assignment at UNM was shortly after I started as a research faculty, In the fall of 1996, when I was asked to teach the evening course of Physics 161. This was my first time as a full lecturer, and I took a rather standard approach to teaching. I lectured on the concepts and problem-solving skills, gave and graded homework problems, posted homework solutions and gave and graded tests. Fortunately, this small evening class afforded me the time to work closely with the students. The feedback that I received on the written part of the ICES forms was very positive, with some suggestion that I spend less time lecturing from the book and my notes. I have tried to implement more dialogs with the students in subsequent courses.

In the spring of 1998, I was asked to teach the physics overview class, Physics 102. I found this class to be particularly challenging since the students taking the class had what I perceived to be diverse expectations from the course. Many students were looking for an easy overview of science in general, while others were expecting the course to provide a good basic background to get them started in the mainstream physics program. I attempted to do both, and got fairly good feedback from the ICES. However, with hindsight, I have some ideas on improving this class and making it more useful to the student and to the department undergraduate program. It seems that many students taking the Physics 150 and 160 courses have never taken high school level physics and do not have many of the skill sets that are needed to complete the courses successfully. I believe that with some careful planning, Physics 102 could be turned into a powerful "remedial" course in physics and problem solving skills that would help to better prepare our mainstream students. If done properly, I believe that this course would draw in many students, increasing the department enrollment and at the same time retaining more students in our Physics 150 and 160 series.

In the spring of 2000, I again taught the evening section of Physics 161. I made several improvements to the way I had taught it in 1996, including a course page on the Web which included a syllabus, homework assignments and solutions, lecture notes, exam solutions and grades. I tried to make an effort to improve the dialog with the students, and since it was again a small class, this was relatively simple to do. In addition, for the first time I taught the problems section, Physics 168, which accompanies the lecture. Through this experience, I have come to believe that every student taking the Physics 150 and 160 series should also take such a recitation class. In fact, I have made the suggestion to the Undergraduate Committee and will reiterate it here: the lecture class, problems class and labs should be combined into one course. I have spoken with several of my colleagues from other universities where this is the standard, and believe that making this change to our curriculum will greatly enhance the experience that the students receive in these courses.

Of course, this will require a great deal of additional resources in order to provide teachers for the additional sections of the recitation and labs, aside from the organizational efforts with the Engineering department,. However, this can be partly solved without an undue burden by requiring each faculty member to teach one section of the recitation in addition to his or her normal teaching load*. The laboratory instructor problem is more problematic, but I believe could be solved by hiring undergraduate physics majors and/or engineering undergraduates or graduate students. The additional financial resources to accomplish this could be attained from the college, which should have a great interest in the improvement in education and retention that this would bring to the university.

In addition to my normal teaching load, it was my pleasure during that semester to present my research to John McGraw's Physics 162 class. This class presents research work by various faculty within the department to undergraduates who, for the most part, are seeing what a physics researcher does for the first time. I made a similar presentation to the Physics 500 class (senior undergraduates and first-year graduate students) in the fall of2002, and again in the fall of 2003 and 2005.

All of the courses that I have discussed so far were taught while I was still a research faculty member in the department. After my appointment to a joint UNM - RBRC tenure-track position in October 2001, I spent the fall stationed at Brookhaven National Laboratory in preparation for the upcoming RHIC Run02. Because of the nature of my joint appointment, every other semester I am asked to spend the majority of my time at BNL, and I have only one semester per year to demonstrate my teaching abilities. In the spring of 2002, I was asked to teach two courses (Physics 161 and Physics 308), in part to help alleviate the deficiency in the number of classes I would teach during my pre-tenure years.

The Physics 161 course was again an evening section with a relatively few number of students, although I have noticed an increasing enrollment in the evening section since I started teaching it in 1996. I built upon the existing Web pages and again taught the problems session for the course. Whenever possible and appropriate to the class material, I would try to tie the lecture into my research. For example, I have discussed with the class how a muon bends in a magnetic field, and how we use that in my research to determine its momentum. I taught Physics 308, the second semester of Junior Lab, primarily out of the manual that was designed for the course by John Panitz, but also lectured at the beginning of the semester from Art of Electronics. However, I found that the students had very little background in hands-on laboratory environment, and it generally took them much more time than was allotted to complete the laboratory activities. I believe that the lab manual needs to be supplemented with a clearer description of the physics of semiconductor devices, lab techniques and general electronics laboratory procedures.

In the fall of 2002, I taught the large daytime section of Physics 160, where I attempted to alter my approach to homework assignments in order to both improve their effectiveness and to lighten somewhat the grading load of the TA's. I have found that many students do not read the material before class, making the lecture less effective. As an incentive to reading the material, I assigned WebAssign problems (Web-based homework) that were due before each lecture.

---

* This is the standard at the Physics Department at the State University of New York, Stonybrook.

These problems were simple and conceptual, but involved principles laid out in the chapter that I would cover during the subsequent lecture. Students that completed these homework assignments were better prepared to understand the lecture and to gain a firmer grasp on the concepts. After each lecture, another set of written homework assignments were due. These problems were more technical, and involved problem solving skills based on the concepts covered in the Web Assign and the lecture. For students needing more help with the problem solving skills, I offered them two Problems classes per week, one taught by me during the regularly scheduled period, and another extra class taught by one of my TA's for those people whose schedule conflicted with the scheduled Problems class. In addition, I had four hours of scheduled office hours and received over 300 emails from students regarding homework problems or grades. I believe that I was successful in engaging the students' interest, getting them better prepared for classes, teaching them the material and assigning meaningful grades.

In the spring of 2003, I was fortunate to have the opportunity to teach a course closely related to my research, Physics 450, Nuclear and Particle Physics. I co-taught this course with Professor Bernd Bassalleck, covering the nuclear physics portion. Although my research training is in Nuclear Physics, I have never taken a formal course in the subject at this level and was challenged to both learn and teach at the same time. I decided to try a different approach to the course, namely I prepared the course completely using PowerPoint and put all the lecture slides on the Web, providing the students with an on-line source of the lecture notes, exams and homework solutions. The biggest challenge in this course was to cover the many aspects of nuclear physics in one-half of a semester without either going too fast or being too trite. Although I was somewhat successful in this, I believe that a full semester is necessary, and will push for this the next time I teach the course. Another down side to brevity of the course was that I did not spend as much time as I would have liked working example problems during class.

Beginning after the Spring Break of 2003, I was again stationed at BNL where I was the Spin Physics Coordinator for the PHENIX experiment during RHIC Run03. This was the start of a nine-month stay at BNL, which went through the fall of 2003, with some periods at UNM.

In spring 2004, I returned to UNM to teach. I was asked to teach a Physics 161 section, but I, together with another faculty member, Dinesh Loomba, strongly urged the department to offer an honors section of the class. The decision to go ahead with this idea, however, came only one week before classes began, so the class was not well advertised as an honors section. In order to keep a sufficient number of students in the class, I thought it best to promise to keep the grades in line with the normal section of the class, which was being held at the same time slot in Regener. This hindered me from what I would have really liked to do with an honors section, that is to offer an advanced course in introductory physics for people with some prior instruction (say, advanced high school physics). Instead, I used the smaller class size to discuss the physics topics in more detail, while not testing at that level. For instance, I discussed how relativity is tied to the magnetic field of a moving charge, something that I would be unable to cover in a normal class. My ICES scores for this class (5.8, 6.0, 6.0) seemed to indicate that the students appreciated the more in-depth approach to physics.

In the fall of 2004, and again in the fall of 2005, I was presented with the opportunity to teach introductory quantum mechanics, Physics 491. This course has indeed been a pleasure to teach as it is the first time that most of the students have been formally introduced to the fascinating world of quantum mechanics. They tend to be extremely motivated and interested, and ask many questions in our dynamic classroom setting. My goal in this course has been to instill a solid foundation in the conceptual understanding of quantum mechanics, and also to begin to make the student aware of the mathematical tools that will be needed to progress further in the field. I believe that my ICES scores were indicative of the student feedback that I received during the course. It was very gratifying that the Physics 491 students nominated me for the Physics and Astronomy Excellence in Teaching award for the 2006-2006 academic year. Receiving that type of award from such talented young students was indeed an honor.

In the fall of 2006, I am teaching the large section of the first semester engineering physics, Physics 160. This class started with over 150 students, and I was committed to applying what I have learned to improving my teaching style in this class. I am assigning a good deal of homework using the online system Mastering Physics, which has the benefit of self tutoring problems. These, rather simple, conceptual problems are assigned before I lecture on the material that they cover, in order to encourage the students to read the material before class. In addition, I am utilizing the student response system on a daily basis for credit, in order to help ensure student attendance in class, and as a way to make class demonstrations more relevant to the students. A by-product of this classroom technology is that I get immediate feedback on the students' understanding of the lecture material. Although the class grades are not yet final, their scores on the first two test were higher than I expected, and I have good expectations about the overall class performance.

Course Evaluations Summary

ICES = Course Content, Instructor, Course in General (out of 6)

Physics 102	Spring 98	57 students	ICES = 4.8, 5.2,4.6
Physics 160	Fall 02	128 students	ICES = 4.8, 4.4, 4.4
	Fall 06	140 students	not yet available
Physics 167	Fall 02		
	Fall 06	20 students	not yet available
Physics 161	Fall 96	9 students	ICES = 5.0, 4.5, 5.0
	Spring 00	10 students	ICES = 4.2, 4.7, 3.6
	Spring 02	24 students	ICES = 4.6, 5.2, 4.4
Physics 161H	Spring 04	16 students	ICES = 5.8, 6.0, 6.0
Physics 162	Spring 00	Single presentation of research	
Physics 168	Spring 00		
	Spring 02	ICES = 5.7, 5.3, 6.0	
Physics 308	Spring 02	7 students	ICES = 5.7, 5.5, 5.7
Physics 450	Spring 03	13 students	ICES = 5.8, 4.7, 5.3
Physics 491	Fall 04	21 students	ICES = 5.7, 5.5, 5.3
	Fall 05	18 students	ICES = 5.6, 5.7, 5.6
Physics 500	Fall 02	Single presentation of research	
	Fall 03	Single presentation of research	
	Fall 04	Single presentation of research	
	Fall 05	Single presentation of research	
	Fall 06	Single presentation of research	

Service Record

Since my arrival at the department of Physics and Astronomy at UNM as a research staff member, I have been active in the promotion of the department as a vigorous and pleasant place to teach and do research. As mentioned earlier, even though my present position as a joint appointee prevents me from being at the University full time, I have committed myself to keeping that record of service to a high standard. My service record before my tenure-track appointment is demonstrative of my commitment to the department even though I was not required to serve in such a role. Instead, it was based on my belief that a single person's efforts to invigorate the department can create an atmosphere of cooperation that brings the department as a whole closer to our mutual goal of an outstanding research and teaching center. I have seen first-hand many examples of work environments where conflict, non-constructive competition and suspicion are the norm, and even though each member of the department was well respected and had a high profile, the department was viewed as a failure. I have committed myself to not taking part in that kind of self-destructive behavior.

General Department Service

My first endeavor at cooperation was simply to make myself available as a substitute for instructors who must, for some reason, miss a class. On several occasions, I have filled in for Kathy Dimiduk, David Wolfe, Dan Finley and others. Although I have been paid back in kind, my intent was to merely set a precedent in the department that teaching duties are all of our responsibilities. Each of us should be interested in the success of the other faculty as teachers, not only because of the reputation of the department is at stake, but because those students may go on to take other classes in the department. I can think of no better compliment for the department than the students feeling that each member of the faculty is interested in their success in every course.

Since becoming tenure track, I have been asked to sit in several oral exam committees. Although several of these have been rather painful both for the student and for the committee, I have enjoyed the challenge of finding good problems that demonstrate the student's knowledge of physics without intimidating them from the start. Although the oral exams have now been eliminated as a part of the graduate requirement (a move which I opposed, since I believe that it should be our goal as a department to improve our students' ability to think on their feet and perform well under pressure), I was pleased to try my hand at teaching the Physics 400 seminar in spring 2004. This course was intended as a preparation class for the oral exams. I started with very simple physics problems, and explored the intricacies by question-and-answer by the group. The feedback which I received from the class was overall positive.

I am privileged to have some excellent collaborators on the PHENIX experiment and have taken advantage of that situation by inviting two of them to come and give colloquia at UNM. I have been host for professors Axel Drees and Jamie Nagle, both young colleagues of mine on PHENIX. I was gratified by the response of the UNM faculty to their excellent talks, and hope that this exposure within the department will help in the mutual understanding of our research program. In the spring of 2006, I will host a well respected theorist from BNL, Werner Wogelsang, for a colloquium and hopefully fruitful discussions about my research.

Graduate Student Recruitment

One of the most difficult challenges facing the physics department in recent years is the relative shortage of well-qualified graduate students. This phenomenon is not unique to UNM, but is systematic throughout the physics community. There are just fewer incoming graduate students, and in general, the quality of those graduate students has declined. There are several ways that I have attempted to address this issue.

First, and foremost, I have tried to keep my research at the cutting edge of my field, broad enough to interest the incoming student, and yet focused enough to keep a unified group. It is every faculty member's responsibility to maintain their research to a high standard so that the department as a whole can continue to attract a good pool of incoming students. I take this responsibility seriously. It not only affects the pool of students interested in my group, but also affects the pool as a whole. I base this upon my experience looking for a graduate school to attend. As I visited several schools, I was keenly interested in the academic level of my would-be peers. I feel that most good students want to come to graduate school to be surrounded by other good students. In other words, every good student that my group attracts will themselves attract students for my and other groups.

In addition to quality research, it is important that faculty members be well known and well respected in their field of research. My appointment as a RBRC Fellow, my work as the Spin Coordinator for PHENIX and my talks at important meetings gives me the visibility needed to keep attracting quality students.

Also necessary, although probably less important, is the job of marketing the department to the outside world. It is necessary in part, because the University has not done its job in recent years, so that the physics department has not even been rated in the usual sources. In order to help overcome this, I organized graduate student open houses in 2000 and 2001. These open houses were coordinated efforts to encourage accepted applicants to choose the department for their graduate career. I scheduled the entire weekend for the students including talks by faculty, lab tours, lunch with current students, and private meetings with faculty. Outings were held on Saturday to show the students a bit of Albuquerque and the enchantment of New Mexico.

In order to attract more students to apply with an interest in nuclear and particle physics at UNM, I initiated a poster campaign to advertise our groups. In 1999, I worked through the University and with the various research groups in the field to design and print a poster for the New Mexico Center for Nuclear and Particle Physics. This poster advertised the many areas of research in which our group is involved, and points to the department and Center web sites for more information. The poster was sent out to physics departments throughout the USA.

The most important thing that I can do to attract good students is to keep my research exiting and on the forefront of my field. Although perhaps luck has played a role in taking me there, I believe that my current research initiative, that of measuring the orbital angular momentum of partons in the nucleon, is truly on the forefront of nuclear physics, and will continue to the attract attention of the community, including good prospective graduate students.

Department Committees

The university model for semi-democratic self-governance requires participation by the faculty in the decision-making processes in order to be successful. Participation usually takes the form of committee membership, as these entities provide the council for the administration, including the chairperson, to base policy. These committees are generally small, focused and work-based groups that must nonetheless reach broad consensus among the faculty. In many circumstances, committee decisions can have enormous impact on the priorities of teaching and research commitments, determine policies for the operations of the department, and set the structure of hiring and advancement within the department.

Since 2002, I have been a member of the department Long Range Planning Committee (LRPC). We have been charged with writing a long-range plan including faculty governance and a hiring plan. As one of the representatives of the nuclear and particle physics group, I helped to write and organize the section on our groups' self-assessment and plan. I have also been involved in discussions covering the entire plan document. I took on a particularly unpopular task by collecting various faculty statistics including funding, student and post-doc levels and research faculty. These statistics will be grouped by research area within the department and used to get a general picture of the department progress and future goals. The department Long-Range Plan has already been extremely useful in providing a baseline for discussions about hiring, and as a template for documentation that is now being required by the upper administration on departmental governance.

In the fall of 2004, I was asked to sit on the Chairs Advisory Committee. This is a small group of people tasked with helping the department Chair to keep communication and therefore consensus among the faculty.

Also in the fall of 2004, I was asked to chair the Regener Hall committee, which is responsible for the operations and development of our teaching facility. Together with another faculty member and the people responsible for the teaching demonstrations and lab facilities, this committee made and implemented upgrades to the audio-visual resources in our large classroom, made enhanced safety recommendations for the room, and began to discuss enhancements to the demonstration system that would include integration of the demonstrations into the student feedback system (student “clickers” that tally student responses to a question and projects the results on the audio-visual system). Again, in the fall of 2005, I was asked to chair this committee, and hope to implement this idea.

Since the fall of 2004, I have also served on the Graduate Examination Committee. This committee’s main task is to compose and grade the bi-yearly preliminary examinations given to the graduate students. In addition, together with the Graduate Committee, the Graduate Examination Committee helps to write the grading and test schedule policy for these exams.

This has been a particularly challenging committee to sit on, as part of its responsibility is to guide students who do not demonstrate sufficient physics skills, out of our program.

University Committees

In addition to the department committee structure, many of the same concerns are addressed at the university level. It is paramount to the smooth operation of the university that faculty members contribute a part of their effort towards university-wide issues.

In spring 2003, I was asked to join the Lane Scholarship Committee (awarded to incoming female students with an interest in science), and was subsequently asked to co-chair the committee. This was the first year for this Arts and Sciences administered scholarship, so the committee had to design the basis for award and then filter the applicant pool and create a list of the best candidates.

In 2003, I submitted several grant proposals in order to fund a research/teaching laboratory for nuclear sensors. From one of the program coordinators of an RFP, I was made aware of a DTRA Strategic University Partnership Program RFP looking to partner with a university for Homeland Security. I wrote a White Paper in response to the RFP and it was accepted for further review. After the acceptance of the Phase I white paper, the Vice Provost for Research convened a committee to draft the Phase II proposal. I was asked to sit on this committee and help write the full proposal. We met several times and submitted the proposal on time. The proposal was accepted, with an award amount up to $51 million. I have continued my involvement in this multi-university program and hope to create a good collaboration between the physics department and DTRA.

Recently, I have been asked to serve on the Academic Success Sub-Committee for the University Provost's Committee on Graduation and Retention. This Sub-Committee is dealing with many of the issues that have been close to my heart during my teaching career, and I hope to be able to help implement many of them through this service.

Community Service and Public Relations

Community service and public relations are extremely important aspects of the university life. In the present atmosphere of economic constraints, the researcher must help educate the community about the importance of their role in society, in part to justify the burden that it puts on society through taxes and student fees. In general, this job is relatively easy, as most people are interested and excited to hear what is going on at the forefront of science. It is the culture of silence ("They don't really care what we do.") that often gets misinterpreted as secrecy and therefore is viewed with suspicion. We should make every effort to be open and to encourage participation by the public in our efforts to broaden the base of knowledge.

I have been involved in several such endeavors. In the spring of 2001, I was asked to be a judge in a Science Fair at Alvarado Elementary School. I have done this in the past as a graduate student, and participated in science fairs as a high school student. It is rewarding to see these first efforts at research, knowing that many of these students will probably come to UNM with an early interest in science.

During the construction of the PHENIX Muon Tracking Stations, and as RHIC began its first year of operations, there were several articles in the large New York based newspapers describing the RHIC program. I was contacted by the local newspapers for a story on the UNM connection to the RHIC project and together with Nicki Bruner, gave information and pictures to the journalists that resulted in two separate articles about our group's research. This kind of public relations leads to a better understanding of our work, more enthusiasm for its funding and possibly future students in our group.

One of the department-wide community relations efforts is the annual physics open house. I have been happy to stay and give tours of my lab and to speak to the young students about my research. Again, I truly hope that the experience was encouraging for them and that I will see them again in class or as a research assistant.

In spring of 2004, I served as a judge in the New Mexico Regional Science Fair held at the University of New Mexico. It is encouraging to see young people so interested and motivated to understand the world around them.

Publications and Talks for Douglas Edward Fields

I. Journals

J1 Fusion Cross Sections for Four Heavy-ion Entrance Channels Leading to the ^{23}Na Compound Nucleus. J.F. Mateja et al., Phys. Rev. **C30**, p.134 (1984).

J2 Non-equilibrium versus Equilibrium Emission of Complex Fragments Emitted in ^{14}N-Induced Reactions on Ag and Au at E/A = 20-50 MeV. D.E. Fields et al., Phys. Lett. **B220**, p.356 (1989).

J3 High Energy Gamma Ray Emission from Proton Induced Reactions. W. Benenson et al., Vern. Dtsch. Phys. Ges. **25**, p.1534 (1990).

J4 Two Proton Correlation Functions for Equilibrium and Non-equilibrium Emission. W.G. Gong et al., Phys Lett. **B246**, p.26 (1990).

J5 Complex Fragment Emission from the ^{3}He + ^{nat}Ag System Between 0.48 and 3.6 GeV. S.J. Yennello et al., Phys. Lett. **B246**, p.26 (1990).

J6 Intensity-Interferometric Test of Nuclear Collision Geometries Obtained from the Boltzman-Uehling-Uhlenbeck Equation. W.G. Gong et al., Phys. Rev. Lett. **65**, p.2114 (1990).

J7 A Logarithmic, Large Solid-Angle Detector Telescope for Nuclear Fragmentation Studies. K. Kwiatkowski et al., Nucl. Inst. And Meth. **A299**, p.166 (1990).

J8 Search for the Onset of Multifragmentation in the Reaction ^{3}He + ^{nat}Ag. E.C. Pollacco et al., Nucl. Phys. **A519**, p.197c (1990).

J9 Space-time Evolution of the Reactions ^{14}N + ^{27}Al, ^{197}Au at E/A = 75 MeV and ^{129}Xe + ^{27}Al, ^{122}Sn at E/A = 31 MeV Probed by Two Proton Intensity Interferometry. W.G. Gong et al., Phys. Rev. **C43**, p1804 (1991).

J10 Complex Fragment Emission in the E/A = 60-100 MeV ^{14}N + ^{nat}Ag, ^{197}Au Reactions. J.L. Wile et al., Phys. Lett. **B264**, p.26 (1991).
J11 Proton-Deuterium Bremsstrahlung at 145 and 195 MeV. J. Clayton et al., Phys. Rev. **C45**, p.1810 (1992).
J12 High Energy Gamma Ray Production in Proton Induced Reactions at 104, 145 and 195 MeV. J. Clayton et al., Phys. Rev. **C45**, p.1815 (1992).
J13 Excitation Functions for Complex Fragment Emission in the E/A = 20 100 MeV ^{14}N + ^{nat}Ag, ^{197}Au Reactions. J.L. Wile et al., Phys. Rev. **C45**, p.2300 (1992).
J14 Neck Emission of Intermediate Mass Fragments in the Fission of Hot Heavy Nuclei. D.E. Fields et al., Phys. Rev. Lett. **69 N26**, p.3713 (1993).
J15 Emission Temperatures from Widely Separated States in ^{14}N- and ^{129}Xe-induced Reactions. C. Schwarz et al., Phys. Rev. **C48**, p.676 (1993).
J16 Studies of Intermediate Mass Fragment Emission in the ^{3}He + ^{nat}Ag, ^{197}Au Reactions Between 0.48 and 3.6 GeV. S.J. Yennello et al., Phys. Rev. **C48**, p.1092 (1993).
J17 Calculations of Bose-Einstein Correlations from Relativistic Quantum Molecular Dynamics. J.P. Sullivan et al., Nucl. Phys. **A566**, p531c (1994).
J18 Single Particle Spectra from NA44. M. Murray et al., Nucl. Phys. **A566**, p.515c (1994).
J19 A Spot Imaging Cherenkov Counter. H. van Hecke et al., Nucl. Inst. and Meth. **A346**, p.127 (1994).
J20 Kaon Interferometry in Heavy-Ion Collisions at the CERN SPS. H. Becker et al., Z. Phys. **C64** p.209 (1994).
J21 Use of Aerogel for Imaging Cherenkov Counters. D.E. Fields et al., Nucl. Inst. and Meth. **A349**, p431 (1994).
J22 m_t Dependence of Boson Interferometry in Heavy-Ion Collisions at the CERN SPS. H. Becker et al.,Phys. Rev. Lett. **74**, p.3340 (1995).
J23 Directional Dependence of the Pion Source in High Energy Heavy-Ion Collisions. H. Bøggild et al., Phys. Lett. **B349** p.386 (1995).
J24 The Relationship between Correlation Function Fit Parameters and Source Distributions. D.E. Fields et al., Phys. Rev. **C52**, p.986 (1995).
J25 Recent Results from NA44 and A Review of HBT. B.V. Jacak et al., Nucl. Phys. **A590** p215c (1995).
J26 Deuteron and Anti-Deuteron Production in CERN Experiment NA44. J. Simon-Gillo et al., Nucl. Phys. **A590** p483c (1995).
J27 Charged Hadron Distributions in p-A and A-A Collisions at the CERN/SPS. I.G. Bearden et al., Nucl. Phys. **A590** p523c (1995).
J28 Low P_t Phenomena in A + A and p + A Collisions at Mid-Rapidity. H. Bøggild et al., Z. Phys. **C69**, p.621 (1996).
J29 Coulomb Effects in Single Particle Distributions. Phys. Lett. **B372** p.339 (1996).
J30 Mid-Rapidity Protons in 158 A GeV Pb + Pb Collisions. I.G. Bearden et al., Phys. Lett. **B388**, p.431 (1996).
J31 Hadron Distributions: Recent Results from the CERN Experiment NA44. NA44 Collaboration (N. Xu et al.), Nucl. Phys. **A610** 175c-187c (1996).
J32 Measuring the Space-Time Extent of Nuclear Collisions Using Interferometry. NA44 Collaboration (A. Franz et al.), Nucl. Phys. **A610** 240c-247c (1996).

J33 Collective Expansion in High Energy Heavy-Ion Collisions. I.G. Bearden et al., Phys. Rev. Lett. **78 N11**, p.2080 (1997).
J34 Multiplicity Dependence of the Pion Source in S + A Collisions at the CERN/SPS. K. Kaimi et al., Z. Phys. **C75** p619 (1997).
J35 Multiplicity Dependence of Pion Source Size in Heavy Ion Collisions. I.G. Bearden et al., Prog. Theor. Phys. Suppl.**129** p161 (1997).
J36 Particle Ratios from Central Pb + Pb Collisions at the CERN/SPS. M. Kaneta et al., J. Phys. **G23** p1865 (1997).
J37 Proton and Anti-Proton Distributions at Midrapidity in Proton Nucleus and Sulphur - Nucleus Collisions. I.G. Bearden et al, Phys. Rev. **C57** p837 (1998).
J38 High-Energy Pb + Pb Collisions Viewed by Pion Interferometry, I.G. Bearden et al., Phys. Rev. **C58** 1656-1665 (1998).
J39 The Phenix Experiment at RHIC. D.P. Morrison et al., Nucl. Phys. **A638** p565 (1998).
J40 Spin Physics with the PHENIX Detector System. N. Saito et al., Nucl. Phys. **A638** p575 (1998).
J41 Kaon and Proton Ratios from Central Pb + Pb Collisions At The CERN SPS. NA44 Collaboration (I.G. Bearden et al.), Nucl. Phys. **A638** 419-422 (1998).
J42 One Particle, Two Particle and Three Particle Hadron Spectra: Recent Results from CERN/SPS Experiment Na44. NA44 Collaboration (I.G. Bearden et al.), Nucl. Phys. **A638** 103-114 (1998).
J43 Two Proton Correlations near Mid-Rapidity in P + Pb and S + Pb Collisions at the Cern SPS. NA44 Collaboration (H. Boggild et al.), Phys. Lett. **B458** 181-189 (1999).
J44 Charged Kaon and Pion Production at Mid-Rapidity in Proton Nucleus and Sulphur Nucleus Collisions. NA44 Collaboration (H. Boggild et al.), Phys. Rev. **C59** 328-335 (1999).
J45 Two Kaon Correlations from Pb + Pb Collisions at 160-A-GeV from NA44. NA44 Collaboration (I.G. Bearden et al.), Nucl. Phys. **A661** 435-438 (1999).
J46 Deuteron and Triton Production in Pb + Pb Collisions at 158-A-GeV. NA44 Collaboration (I.G. Bearden et al.), Nucl. Phys. **A661** 387-390 (1999).
J47 Anti-Deuteron and Kaon Production in Pb + Pb Collisions. NA44 Collaboration (I.G. Bearden et al.), Nucl. Phys. **A661** 55-64 (1999).
J48 Results from PS185. P.D. Barnes et al., Nucl. Phys. **A655** 173-178 (1999).
J49 Strange Meson Enhancement in Pb Pb Collisions. NA44 Collaboration (I. Bearden et al.), Phys. Lett. **B471** 6-12 (1999).
J50 One-Dimensional and Two-Dimensional Analysis of 3 Pion Correlations Measured in Pb + Pb Interactions. NA44 Collaboration (I.G. Bearden et al.), Phys. Lett. **B517** 25-31 (2001).
J51 Centrality Dependence of Charged Particle Multiplicity in Au - Au Collisions at $\sqrt{s_{NN}}$ = 130-GeV. PHENIX Collaboration (K. Adcox et al.), Phys. Rev. Lett. **86** 3500-3505 (2001).
J52 Measurement of the Mid-Rapidity Transverse Energy Distribution from $\sqrt{s_{NN}}$ = 130-GeV Au + Au Collisions at RHIC. PHENIX Collaboration (K. Adcox et al.), Phys. Rev. Lett. **87** 052301 (2001).

J53 Measurement of Analyzing Power for Proton Carbon Elastic Scattering in the Coulomb Nuclear Interference Region with a 22-GeV/c Polarized Proton Beam. J. Tojo et al., Phys. Rev. Lett. **89** 052302 (2002).
J54 Measurement of Spin Transfer Observables in Anti-Proton Proton ---> Anti-Lambda Lambda At 1.637-GeV/c. PS185 collaboration (B. Bassalleck et al.), Phys. Rev. Lett. **89** 212302 (2002).
J55 Measurement of the Lambda and Anti-Lambda Particles in Au+Au Collisions at $\sqrt{s_{NN}}$ = 130-GeV. PHENIX Collaboration (K. Adcox et al.), Phys. Rev. Lett. **89** 092302 (2002).
J56 Flow Measurements via Two Particle Azimuthal Correlations in Au+Au Collisions at $\sqrt{s_{NN}}$ = 130-GeV. PHENIX Collaboration (K. Adcox et al.), Phys. Rev. Lett. **89** 212301 (2002).
J57 Event-By-Event Fluctuations in Mean p_T and Mean E_T in $\sqrt{s_{NN}}$ = 130-GeV Au+Au Collisions. PHENIX Collaboration (K. Adcox et al.), Phys. Rev. **C66** 024901 (2002).
J58 Net Charge Fluctuations in Au+Au Interactions at $\sqrt{s}$ = 130-GeV. PHENIX Collaboration (K. Adcox et al.), Phys. Rev. Lett. **89** 082301 (2002).
J59 Particle Production in Pb + Pb Collisions at the CERN SPS. NA44 Collaboration (I.G. Bearden et al.), Phys. Rev. **C66** 044907 (2002).
J60 Measurement of Single Electrons and Implications for Charm Production In Au+Au Collisions At $\sqrt{s_{NN}}$ = 130-GeV. PHENIX Collaboration (K. Adcox et al.), Phys. Rev. Lett. **88** 192303 (2002).
J61 Transverse Mass Dependence of Two Pion Correlations in Au+Au Collisions at $\sqrt{s_{NN}}$ = 130-GeV. PHENIX Collaboration (K. Adcox et al.), Phys. Rev. Lett. **88** 192302 (2002).
J62 Centrality Dependence of π^+/π^-, K^+/K^-, p and Anti-P Production from $\sqrt{s_{NN}}$ = 13-GeV Au+Au Collisions at RHIC. PHENIX Collaboration (K. Adcox et al.), Phys. Rev. Lett. **88** 242301 (2002).
J63 Commissioning Of RHIC p Carbon CNI Polarimeter. H. Huang et al., Nucl. Phys. **A721** 356-359 (2003).
J64 Suppression of Hadrons with Large Transverse Momentum in Central Au+Au Collisions at $\sqrt{s_{NN}}$ = 130-GeV. By PHENIX Collaboration (K. Adcox et al.), Phys. Rev. Lett. **88** 022301 (2002).
J65 Event Texture Search For Phase Transitions in Pb + Pb Collisions. By NA44 Collaboration (I. Bearden et al.), Phys. Rev. **C65** 044903 (2002).
J66 Overview of Phenix Results from the First RHIC Run. By PHENIX Collaboration (W.A. Zajc et al.), Nucl. Phys. **A698** 39-53 (2002).
J67 Event Texture Search for Critical Fluctuations in Pb + Pb Collisions. NA44 Collaboration (Mikhail L. Kopytine et al.), Nucl. Phys. **A698** 651-654 (2002).
J68 Particle Production in Central Pb + Pb Collisions at 158-A-Gev/c. I. G. Bearden et al., Phys. Rev. **C66** 044907 (2002).
J69 Absence of Suppression in Particle Production at Large Transverse Momentum in $\sqrt{s_{NN}}$ = 200-GeV d + Au Collisions. PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. Lett. **91** 072303 (2003).

J70 Scaling Properties of Proton and Anti-Proton Production in $\sqrt{s_{NN}}$ 200-GeV Au+Au Collisions. PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. Lett. **91** 172301 (2003).

J71 Elliptic Flow of Identified Hadrons in Au+Au Collisions at $\sqrt{s_{NN}}$ = 200-GeV. PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. Lett. **91** 182301 (2003).

J72 Suppressed π^0 Production at Large Transverse Momentum in Central Au+ Au Collisions at $\sqrt{s_{NN}}$ = 200 GeV. PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. Lett. **91** 072301 (2003).

J73 Mid-Rapidity Neutral Pion Production in Proton Proton Collisions at $\sqrt{s}$ = 200-GeV. By PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. Lett. **91** 241803 (2003).

J74 Centrality Dependence of the High p_T Charged Hadron Suppression in Au+Au Collisions at $\sqrt{s_{NN}}$ = 130-GeV. PHENIX Collaboration (K. Adcox et al.), Phys. Lett. **B561** 82-92 (2003).

J75 PHENIX On-Line Systems. PHENIX Collaboration (S.S. Adler et al.), Nucl. Instrum. Meth. **A499** 560-592 (2003).

J76 PHENIX Muon Arms. PHENIX Collaboration (H. Akikawa et al.), Nucl. Instrum. Meth. **A499** 537-548 (2003).

J77 PHENIX Detector Overview. PHENIX Collaboration (K. Adcox et al.), Nucl. Instrum. Meth. **A499** 469-479 (2003).

J78 RHIC p-C CNI Polarimeter: Status and Performance from the First Collider Run. O. Jinnouchi et al., Czech. J. Phys. **53** B409-B415 (2003).

J79 Double Helicity Asymmetry in Inclusive Mid-Rapidity π^0 Production for Polarized p+p Collisions at $\sqrt{s}$ = 200-GeV. By PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. Lett. **93** 202002 (2004).

J80 Depolarization and Spin Transfer in Anti-P P ---> Antilambda Lambda with a Polarized Target. B. Bassalleck et al., Nucl. Instrum. Meth. **B214** 167-170 (2004).

J81 Bose-Einstein Correlations of Charged Pion Pairs in Au + Au Collisions at $\sqrt{s_{NN}}$ = 200-GeV. By PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. Lett. **93** 152302 (2004).

J82 Measurement of Nonrandom Event By Event Fluctuations of Average Transverse Momentum in $\sqrt{s_{NN}}$ = 200-GeV Au+Au and p+p Collisions. PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. Lett. **93** 092301 (2004).

J83 High p_T Charged Hadron Suppression in Au + Au Collisions At $\sqrt{s_{NN}}$ = 200-GeV. PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. **C69** 034910 (2004).

J84 Identified Charged Particle Spectra and Yields in Au+Au Collisions at $\sqrt{s_{NN}}$ = 200-GeV. PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. **C69** 034909 (2004).

J85 Single Identified Hadron Spectra From $\sqrt{s_{NN}}$ = 130-GeV Au+Au Collisions. By PHENIX Collaboration (K. Adcox et al.), Phys. Rev. **C69** 024904 (2004).

J86 J/ψ Production from Proton-Proton Collisions at $\sqrt{s}$ = 200-GeV. PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. Lett. **92** 051802 (2004).

J87 J/ψ Production in Au+Au Collisions at $\sqrt{s_{NN}}$ = 200-GeV at the Relativistic Heavy Ion Collider. By PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. **C69** 014901 (2004).

J88 Centrality Dependence of Direct Photon Production in $\sqrt{s_{NN}}$ = 200-GeV Au + Au Collisions, PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. Lett. **94** 232301 (2005).

J89 Mid-Rapidity Direct-Photon Production in P+P Collisions at $\sqrt{s}$ = 200-GeV. PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. **D71** 071102 (2005)

J90 Nuclear Modification Factors for Hadrons at Forward and Backward Rapidities in Deuteron-Gold Collisions at $\sqrt{s_{NN}}$ = 200-GeV. PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. Lett. **94** 082302 (2005).

J91 Saturation of Azimuthal Anisotropy in Au + Au Collisions at $\sqrt{s_{NN}}$ 62-GeV To 200-GeV. PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. Lett. **94** 232302 (2005).

J92 Formation of Dense Partonic Matter in Relativistic Nucleus-Nucleus Collisions at RHIC: Experimental Evaluation by the PHENIX Collaboration. PHENIX Collaboration (K. Adcox et al.), Nucl. Phys. **A757** 184-283 (2005).

J93 Centrality Dependence of Charm Production from Single Electrons Measurement in Au + Au Collisions at $\sqrt{s_{NN}}$ = 200-GeV. PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. Lett. **94** 082301 (2005).

J94 Systematic Studies of the Centrality and $\sqrt{s_{NN}}$ Dependence Of The $dE_T/d\eta$ and $dN_{Ch}/d\eta$ in Heavy Ion Collisions at Mid-Rapidity. PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. **C71** 034908 (2005), Erratum-ibid. **C71** 049901 (2005).

J95 Jet Structure of Baryon Excess in Au + Au Collisions at $\sqrt{s_{NN}}$ = 200-GeV. PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. **C71** 051902 (2005).

J96 Deuteron and Antideuteron Production in Au + Au Collisions at $\sqrt{s_{NN}}$ = 200-GeV. PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. Lett. **94** 122302 (2005).

J97 Production of Phi Mesons at Mid-Rapidity in $\sqrt{s_{NN}}$ = 200- GeV Au+Au Collisions at RHIC. PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. C 72, 014903 (2005), nucl-ex/0410012.

J98 Measurement of Single Electron Event Anisotropy in Au+Au Collisions at $\sqrt{s_{NN}}$ = 200-GEV. PHENIX Collaboration (S.S. Adler et al.), Phys. Rev. C 72, 024901(2005), nucl-ex/0502009

J99 Σ^+ + p elastic scattering cross section in the region of $350 < p_{\Sigma^+} \leq 750\, MeV/c$ with a scintillating fiber active target, J.K. Ahn et al., Nucl. Phys. A761, 41 (2005).

J100 Improved Measurement of Double Helicity Asymmetry in Inclusive Midrapidity π^0 Production for Polarized p+p Collisions at $\sqrt{s}$ =200 GeV, S.S. Adler, et al., Phys.Rev. D73 (2006) 091102.

J101 Azimuthal Angle Correlations for Rapidity Separated Hadron Pairs in d+Au Collisions at $\sqrt{s_{NN}}$ = 200 GeV, S.S. Adler, et al., Phys. Rev. Lett. 96, 222301 (2006).

J102 Nuclear Modification of Electron Spectra and Implications for Heavy Quark Energy Loss in Au+Au Collisions at $\sqrt{s_{NN}}$ =200 GeV, S.S. Adler, et al., Phys.Rev.Lett. 96 (2006) 032301.

J103 Evidence for a Long-Range Component in the Pion Emission Source in Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV, S.S. Adler, et al., Submitted to Phys. Rev. Lett. (nucl-ex/0605032).

J104 Common Suppression Pattern of High-p_T η and π^0 Mesons at High Transverse Momentum in Au+Au Collisions at $\sqrt{s_{NN}}$ = 200 GeV, S.S. Adler, et al., Phys.Rev.Lett. 96 (2006) 202301.

J105 Measurement of Transverse Single-Spin Asymmetries for Mid-rapidity Production of Neutral Pions and Charged Hadrons in Polarized p+p Collisions at $\sqrt{s}$ = 200 GeV, S.S. Adler, et al., Phys.Rev.Lett. 95 (2005) 202001.

J106 Measurement of Identified π^0 and Inclusive Photon v_2 and Implication to the Direct Photon Production in $\sqrt{s_{NN}}$ = 200 GeV Au+Au Collisions, S.S. Adler, et al., Phys. Rev. Lett. 96 (2006) 032302.

J107 Centrality Dependence of Direct Photon Production in $\sqrt{s_{NN}}$ = 200 GeV Au+Au Collisions, S.S. Adler, et al., Phys.Rev.Lett. 94 (2005) 232301.

J108 Jet Structure from Dihadron Correlations in d+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV, S.S. Adler, et al., Phys. Rev. C73 (2006) 054903.

J109 J/ψ Production and Nuclear Effects for d+Au and p+p Collisions at $\sqrt{s_{NN}}$ = 200 GeV, S.S. Adler, et al., Phys.Rev.Lett. 96 (2006) 012304.

J110 Single Electrons from Heavy Flavor Decays in p+p Collisions at $\sqrt{s}$ = 200 GeV, S.S. Adler, et al., Phys.Rev.Lett. 96 (2006) 032001.

J111 An Update on the Double Helicity Asymmetry in Inclusive Midrapidity π^0 Production for Polarized p+p Collisions at $\sqrt{s}$ =200 GeV, S.S. Adler, et al., Phys. Rev. D 73, 091102(R) (2006).

J112 Modifications to Di-Jet Hadron Pair Correlations in Au+Au Collisions at $\sqrt{s_{NN}}$ = 200 GeV, S.S. Adler, et al., Phys. Rev. Lett. 97, 052301 (2006) (nucl-ex/0507004).

J113 Nuclear Effects on Hadron Production in d+Au and p+p Collisions at $\sqrt{s_{NN}}$ =200 GeV, S.S. Adler, et al., Phys. Rev. C 74, 024904 (2006) (nucl-ex/0603010).

J114 π^0/photon v_2 in Au+Au collisions at $\sqrt{s_{NN}}$ =200 GeV, S.S. Adler, et al., Phys. Rev. Lett. 96, 032302 (2006).

J115 Jet Properties from Dihadron Correlations in p+p Collisions at $\sqrt{s}$ =200 GeV, S.S. Adler, et al., Phys. Rev. D 74, 072002 (2006) (hep-ex/0605039).

J116 Production of Phi Mesons at Mid-rapidity in $\sqrt{s_{NN}}$ = 200 GeV Au+Au Collisions at RHIC, S.S. Adler, et al., Phys.Rev. C72 (2005) 014903.

J117 Centrality Dependence of π^0 and η Production at Large Transverse Momentum in $\sqrt{s_{NN}}$ = 200 GeV d+Au Collisions, S.S. Adler, et al., submitted to Phys. Rev. Lett. (2006).

J118 Scaling Properties of Azimuthal Anisotropy in Au+Au and Cu+Cu Collisions at $\sqrt{s_{NN}}$ =200 GeV, A. Adare, et al., submitted to Phys. Rev. Lett. (2006).

J119 Measurement of High-p_T Single Electrons from Heavy-Flavor Decays in p+p Collisions at $\sqrt{s}$ =200$ GeV, A. Adare, et al., accepted at Phys. Rev. Lett., (2006).

J120 Precision Measurement of Direct Photon Production in p+p Collisions at $\sqrt{s}$ = 200 GeV, S.S. Adler, et al., submitted to Phys. Rev. Lett. (2006).

J121 Measurement of Single Muons at Forward Rapidity in p+p Collisions at $\sqrt{s}$ = 200 GeV and Implications for Charm Production, S.S. Adler, et al., submitted to Phys. Rev. D (2006).

II. Talks and Seminars.

T1 "Excitation Functions for Complex Fragments Emitted in ^{14}N-Induced Reactions from E/A = 20-100 MeV", D.E. Fields et al., *Proceedings of the Sixth Winter Workshop on Nuclear Dynamics*, Jackson Hole, Wyoming January 1990.

T2 "Source Properties of Intermediate Mass Fragments Produced in Intermediate Energy Nuclear Reactions", D.E. Fields, Tennessee Technological University Nuclear Physics Seminar, Cookeville, Tennessee, September, 1991.

T3 "Emission of IMF's Normal to the Fission Axis in Hot Heavy Nuclei", D.E. Fields et al., *Proceedings of the Eighth Winter Workshop on Nuclear Dynamics,* Jackson Hole, Wyoming, January, 1992.

T4 "Intermediate Mass Fragment Production from Intermediate Energy Nuclear Reactions", D.E. Fields, P-2 Nuclear Physics Seminar, Los Alamos National Laboratory, Los Alamos, New Mexico, June 1992.

T5 "Results from Two-Particle Correlation Studies from CERN Experiment NA44", D.E. Fields, NPP Talk, Los Alamos National Laboratory, Los Alamos, New Mexico, October, 1993.

T6 "Results from Two-Particle Correlation Studies from CERN Experiment NA44", D.E. Fields, T2 Seminar, Los Alamos National Laboratory, Los Alamos, New Mexico, March, 1994.

T7 "Intensity Interferometry: A Global RQMD Study", D.E. Fields, Corinne II Workshop on Multiparticle Correlations and Nuclear Reactions, Chateau de Clermont, Nante, September 6-10, 1994.

T8 "Status Report on Charm Studies", D.E. Fields, PHENIX Muon Arm Collaboration Meeting, UNM, Albuquerque, New Mexico, August 14, 1995.

T9 "Muon Tracking Station One Status and Plans", D.E. Fields, PHENIX Muon Arms Collaboration Meeting, Kyoto, Japan, November 17, 1995.

T10 "RHIC Spin", D.E. Fields, High Energy Physics Seminar, The University of New Mexico, Albuquerque, New Mexico, April 23, 1996.

T11 "Muon Tracking Station One Status and Plans", D.E. Fields, PHENIX Muon Arms Collaboration Meeting, Costa Mesa, California, February 28, 1997.

T12 "Electron-Muon Coincidence Studies", D.E. Fields, PHENIX Collaboration Meeting, Santa Fe, New Mexico, July 23, 1997.

T13 "Status of the Muon Subsystem", D.E. Fields, PHENIX Collaboration Meeting, Santa Fe, New Mexico, July 26, 1997.

T14 "Proposal to the IUCF Program Advisory Committee", D.E. Fields for the p+C CNI Collaboration, IUCF PAC, November 24, 1997.

T15 "A Proposal For A (p+C) CNI Polarimeter for RHIC", D.E. Fields, RHIC-Spin Collaboration Meeting, Brookhaven National Laboratory, August 27, 1998.

T16 "Muon Tracking Station One Status", D.E. Fields, PHENIX Muon Arms Collaboration Meeting, Brookhaven National Laboratory, June 28, 1999.

T17 "A CNI Polarimeter for RHIC Spin Results from IUCF CE75 & AGS E950", D.E. Fields, AGS Users Meeting, Brookhaven National Laboratory, July 30, 1999.

T18 "Muon Tracking Station One Status, Schedule and Cost", D.E. Fields, Muon Arms Technical Advisory Committee Review, Brookhaven National Laboratory, September 10, 1999.

T19 "The Physics and Status of the PHENIX Muon Arms", D.E. Fields, Meeting of the American Physical Society, Long Beach, CA, May 1, 2000.

T20 "Spin Physics With PHENIX", presented at the Conference on the Intersections of Particle and Nuclear Physics, New York City, May, 2003.

T21 "Spin Physics With PHENIX", presented at the PHENIX collaboration meeting, Vanderbuilt University, Nashville, TN, Aug. 2003.

T22 "Status and Physics of the PHENIX Muon Arms", presented at the RIKEN-BNL Research Center annual review, Nov., 2003.

T23 "PHENIX Overview", invited talk at the 1st Summer School on QCD Spin Physics, held at Brookhaven National Laboratory, June 5-12, 2004.

T24 "Resent Results from PHENIX", invited talk at the Nuclear Physics Seminar, Kyoto University Department of Physics, Kyoto, Japan, Aug., 2004.

T25 "J/Psi Physics in p+p, d+Au and Au+Au collisions in the PHENIX Muon Arms", presented at the RIKEN-BNL Research Center annual review, Nov., 2004.

T26 "Measuring Orbital Angular Momentum Using Jet kT ", invited talk at the Single Spin Asymmetry Workshop, RIKEN-BNL Research Center, Brookhaven National Laboratory, Upton, NY, May, 2005.

T27 "Measuring Orbital Angular Momentum Using Jet kT ", invited talk at the RHIC-AGS User's Meeting, Brookhaven National Laboratory, Upton, NY, June, 2005.

T28 "PHENIX Muon Subsystem" talk at the PHENIX SpinFest, Wako, Japan, July 2005.

T29 "Spin Physics With PHENIX", Douglas Fields, 5th Circum-Pan-Pacific Symposium on High Energy Spin Physics, Tokyo, Japan, July 5-8, 2005.

T30 "Toward Measuring the Internal Spin-Dependent Transverse Momentum of Quarks and Gluons in the Proton at RHIC", Douglas Fields, RBRC Review, Brookhaven National Laboratory, October 8-13, 2005.

T31 "Measuring Orbital Angular Momentum through Jet kT", Douglas Fields, Joint UNM/RBRC Workshop on Parton Orbital Angular Momentum, Albuquerque New Mexico, Feb. 23 -26, 2006.

T32 "Jet kT as an Access to Orbital Angular Momentum", Douglas Fields, CIPANP 2006, Westin Rio Mar Beach, Puerto Rico, May 30 – June 3, 2006.

T33 "Spin and the Lattice - Experimental Overview", Douglas Fields, RBRC Workshop on RHIC Physics in the Context of the Standard Model, Brookhaven National Laboratory, June 18-23, 2006.

T34 "kT Asymmetry in Longitudinally Polarized pp Collisions" Douglas Fields, The 17th International Spin Physics Symposium, SPIN2006, Kyoto, Japan, October 1 -8, 2006.

III. Other Publications.

O1 Physics 231 Laboratory Manual, Published by Tennessee Technological University, last revised 1995.

O2 "Physics of Polarimetry at RHIC" Proceedings of the RIKEN BNL Research Center Workshop Volume 10, BNL-65926, Organized by Ken Imai and Doug Fields.

O3 "Parton Orbital Angular Momentum" Proceedings of the Joint RBRC/UNM Workshop Volume 81, BNL-75937-2006, Organized by Doug Fields, Gerry Bunce and Werner Vogelsang.