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# Polarons

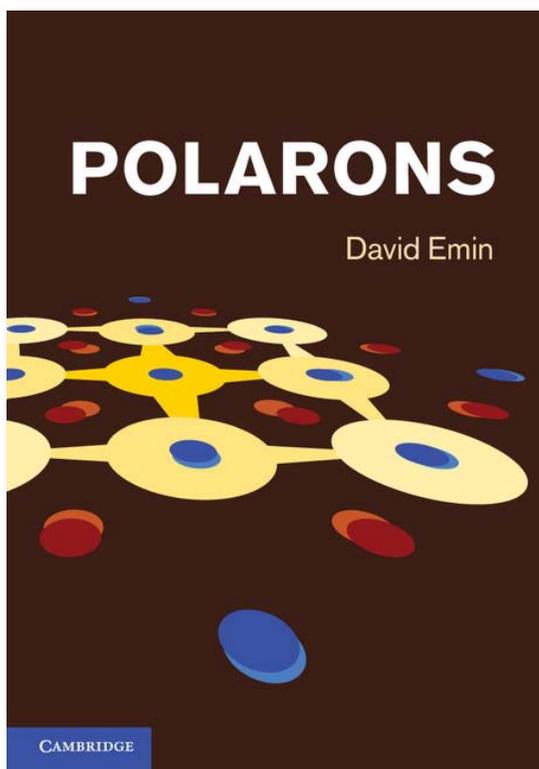
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## About the Book

Emin provides experimental and theoretical graduate students and researchers with a distinctive introduction to the principles governing polaron science. The fundamental physics is emphasized and mathematical formalism is avoided. The book gives a clear guide to how different types of polaron form and the measurements used to identify them. Analyses of four diverse physical problems illustrate polaron effects producing dramatic physical phenomena. The first part of the book describes the principles governing polaron and bipolaron formation in different classes of materials. The second part emphasizes distinguishing electronic-transport and optical phenomena through which polarons manifest themselves. The book concludes by extending polaron concepts to address critical aspects of four multifaceted electronic and atomic problems: large bipolarons' superconductivity, electronic switching of small-polaron semiconductors, electronically stimulated atomic desorption and diffusion of light interstitial atoms.

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### Key Features

- Describes how and when polarons and bipolarons form and the distinctive properties that manifest their presence
- Assumes no prior knowledge of polarons and bipolarons
- Emphasizes fundamental physics rather than mathematical formalism

### Contents

Preface; Acknowledgements; 1. Succinct overview; Part I. Polaron Formation: 2. Electron-phonon interactions; 3. Weak-coupling polarons: carrier-induced softening; 4. Strong-coupling: self-trapping; 5. Dopant- and defect-related small polarons; 6. Molecular polarons; 7. Bipolarons; 8. Magnetic polarons and colossal magneto-resistance; Part II. Polaron Properties: 9. Optical properties; 10. Large-polaron transport; 11. Small-polaron transport; 12. Polarons' Seebeck coefficients; 13. Polarons' Hall Effect; Part III. Extending Polaron Concept: 14. Superconductivity of large bipolarons; 15. Non-Ohmic hopping conduction and electronic switching; 16. Electronically stimulated desorption of atoms from surfaces; 17. Hopping of light atoms; References; Index.

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