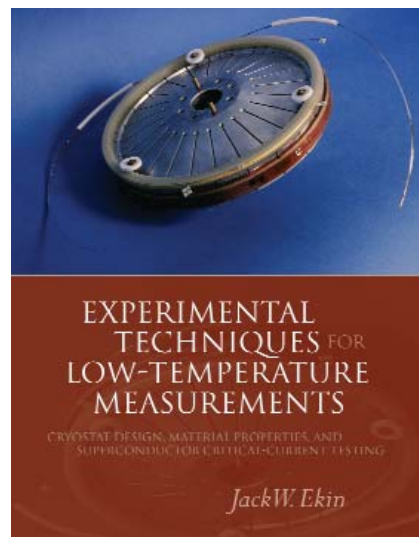


Experimental Techniques for Low-Temperature Measurements

CRYOSTAT DESIGN, MATERIAL PROPERTIES, AND SUPERCONDUCTOR CRITICAL-CURRENT TESTING

Jack Ekin, National Institute of Standards and Technology, Boulder, Colorado, USA

- A highly integrated text that builds a consistent, self-supporting knowledge base of low-temperature apparatus design, one idea at a time
- Tutorial aspects include detailed discussions of measurement techniques, operating procedures, vacuum technology, and safety
- Covers many recent developments in measurement techniques, superconductors, and scaling theory not previously published



This book presents a highly integrated, step-by-step approach to the design and construction of low-temperature measurement apparatus. It is effectively two books in one: A textbook on cryostat design techniques and an appendix data handbook that provides materials-property data for carrying out that design. The main text encompasses a wide range of information, written for specialists, without leaving beginning students behind. After summarizing cooling methods, **Part I** provides core information in an accessible style on techniques for cryostat design and fabrication including heat-transfer design, selection of materials, construction, wiring, and thermometry, accompanied by many graphs, data, and clear examples. **Part II** gives a practical user's perspective of sample mounting techniques and contact technology. **Part III** applies the information from **Parts I** and **II** to the measurement and analysis of superconductor critical currents, including in-depth measurement techniques and the latest developments in data analysis and scaling theory. The **appendix** is a ready reference handbook for cryostat design, encompassing seventy tables compiled from the contributions of experts and over fifty years of literature.

'I could not wait for this book to appear in print. I will make it required reading for anyone designing cryogenic probes for use in our laboratory.' **Dr Bruce Brandt, Director DC High-Field Facilities, U.S. National High Magnetic Field Laboratory, Tallahassee, Florida**

'I am very impressed with the mixture of rigour and practicality that the book offers. [...] The charts are a treasure trove of practical information.' **Professor Mark Colclough, University of Birmingham**

'I really liked the example calculations [...] If you don't find the information in the text, one can be sure that it's in the Appendix. This makes the text a 'stand-alone' book on cryostat design' **Karsten Guth, doctoral graduate student, Universität Göttingen**

Contents: *Part I: Introduction to Measurement Cryostats and Cooling Methods, Heat Transfer at Cryogenic Temperatures, Cryostat Construction, Wiring and Connections, Temperature Measurement and Control, Properties of Solids at Low Temperatures, Part II: Sample Holders, Sample Contacts, Part III: Critical-Current Measurements, Critical-Current Data Analysis, Appendixes: Data Handbook of Material Properties and Cryostat Design.*

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