

hierarchical structure. It is the insights gained from this mean-field theory that have proved so useful in a new "statistical" approach to more general problems in optimization theory (such as the traveling salesman problem) and in the theory of neural networks and other complex systems.

In their excellent and timely book Konrad Fischer and John Hertz, both of whom have played major roles in the development of the theory, have done a considerable service to the condensed-matter community by giving us a very readable and comprehensive account of the key theoretical concepts and an informed discussion of some important experimental results. A major part of the book is of course devoted to the mean-field theory in its many guises, culminating in Giorgio Parisi's celebrated solution in which the hierarchical structure of the phase space is coded in a hierarchically organized order-parameter matrix (illustrated on the front cover of the book). One welcome feature of the book is the authors' gradual approach to the more difficult parts of the theory through a sequence of physically motivated approximations.

An important unresolved question in spin-glass theory is the extent to which the mean-field theory correctly describes the ordered phase when the interactions are of finite range (or are effectively finite, as in laboratory spin glass). It is nice to see a complete and clearly presented exposition of the rival phenomenological scaling (or droplet) theory based on plausible assumptions about the nature of the large-scale, low-lying excitations from the ground state. Only now are experiments that can confront this issue being performed. This book is also excellent background reading for researchers interested in other glassy phases and general problems in complexity theory. An example of considerable current interest is the "vortex-glass" phase of type-II superconductors, which shares much of the conceptual framework of spin glasses.

Spin Glasses is intended both as a comprehensive survey for experts who have worked in a limited subfield and as an introduction for those from other areas of condensed-matter physics. It serves the former group admirably. For the latter group, those with a good grounding in statistical mechanics and a familiarity with phase transitions at least at the level of Landau theory will find that the book provides a superb introduction to this fascinating field.

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