

1. Record Nr.	UNINA9910140788903321
Autore	Parkinson John
Titolo	An introduction to quantum spin systems / / John Parkinson, Damian J J Farnell
Pubbl/distr/stampa	Berlin ; ; Heidelberg, : Springer-Verlag, 2010
ISBN	9786613560032 9781280382123 1280382120 9783642132902 3642132901
Edizione	[1st ed. 2010.]
Descrizione fisica	1 online resource (XI, 154 p. 22 illus.)
Collana	Lecture notes in physics, , 0075-8450 ; ; 816
Altri autori (Persone)	FarnellDamian J. J
Disciplina	539.7/25
Soggetti	Nuclear spin Quantum theory
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Bibliographic Level Mode of Issuance: Monograph
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Spin Models -- Quantum Treatment of the Spin-½ Chain -- The Antiferromagnetic Ground State -- Antiferromagnetic Spin Waves -- The XY Model -- Spin-Wave Theory -- Numerical Finite-Size Calculations -- Other Approximate Methods -- The Coupled Cluster Method -- Quantum Magnetism.
Sommario/riassunto	The topic of lattice quantum spin systems is a fascinating and by now well-established branch of theoretical physics. However, many important questions remain to be answered. Their intrinsically quantum mechanical nature and the large (usually effectively infinite) number of spins in macroscopic materials often leads to unexpected or counter-intuitive results and insights. Spin systems are not only the basic models for a whole host of magnetic materials but they are also important as prototypical models of quantum systems. Low dimensional systems (as treated in this primer), in 2D and especially 1D, have been particularly fruitful because their simplicity has enabled exact solutions to be determined in many cases. These exact solutions contain many highly nontrivial features. This book was inspired by a set of lectures on quantum spin systems and it is set at a level of practical

detail that is missing in other textbooks in the area. It will guide the reader through the foundations of the field. In particular, the solutions of the Heisenberg and XY models at zero temperature using the Bethe Ansatz and the Jordan-Wigner transformation are covered in some detail. The use of approximate methods, both theoretical and numerical, to tackle more advanced topics is considered. The final chapter describes some very recent applications of approximate methods in order to show some of the directions in which the study of these systems is currently developing.

---