Ising Centennial Colloquium

Introduction

The stories of Ernst Ising, and of the model that bears his name, are each remarkable in their own way, as is the absence of Ising, the man, from the latter story over many decades. Ising was caught up in the dreadful series of events that has come to be known as the Holocaust ('the Hitlerei', in Pauli's words), only narrowly escaping the fate that befell so many victims all accross Europe. Meanwhile, the Ising model (introduced, as Ising was always careful to point out, by his advisor Lenz), began its illustrious trajectory in the hands of Landau, Peierls, Kramers, Onsager, and a host of brilliant scientists in the generations that followed. The model has been at the center of the modern theory of critical phenomena, one of the recent triumphs of theoretical physics. Originally intended as a first step in understanding ferromagnetism, it turns up in diverse fields: liquids and solutions, spin glasses, cell membranes, immune-system modelling, and social behavior, among others. Verifying the model's relevance to real materials has motivated a series of benchmark experimental investigations. The model served, at the same time, as the prime testing-ground for one breakthrough after another in the area of simulations. A wealth of physics remains to be mined from the simple yet subtle game of 'spins' on a chessboard; what geniuses of the future will discover there can hardly be guessed.

In the year of the 100th birthday of Ernst Ising we gathered to discuss both historical and recent developments connected with the Ising model. The Ising Centennial Colloquium was held on August 1 - 4, 2000, at Universidade Federal de Minas Gerais, Belo Horizonte. It was attended by over 100 participants, with three days of talks and a poster session. There were 19 invited speakers, whose talks covered experiment, simulation, theory and applications of the Ising model, as well as the life of Ising himself.

This special issue of the Brazilian Journal of Physics contains articles based on the works presented at the Colloquium. While the subject is too vast for all of its aspects to be covered in a single conference or volume, we sincerely hope that this collection will be useful to researchers and students in statistical physics and related areas, who are currently working on the Ising model, or would like to know more about it.

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