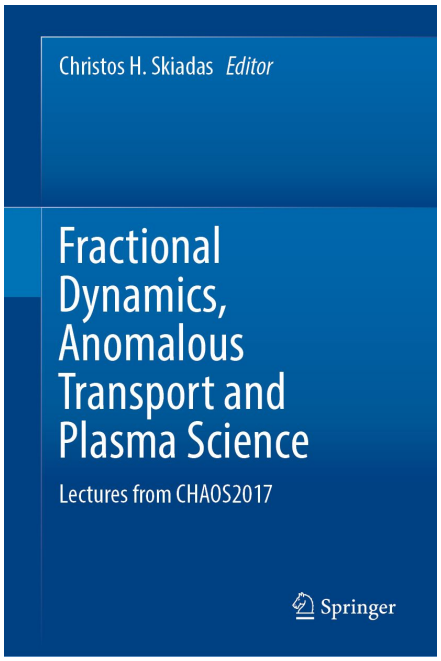

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Christos H. Skiadas (Ed.)

Fractional Dynamics, Anomalous Transport and Plasma Science

Lectures from CHAOS2017

- Explores the state of the art in various related fields
- Contains contributions on the history of arc plasmas and the magnetron
- Offers lecture-like presentation of the subject matter

This book collects interrelated lectures on fractal dynamics, anomalous transport and various historical and modern aspects of plasma sciences and technology. The origins of plasma science in connection to electricity and electric charges and devices leading to arc plasma are explored in the first contribution by Jean-Marc Ginoux and Thomas Cuff. The second important historic connection with plasmas was magnetism and the magnetron. Victor J. Law and Denis P. Dowling, in the second contribution, review the history of the magnetron based on the development of thermionic diode valves and related devices. In the third chapter, Christos H Skiadas and Charilaos Skiadas present and apply diffusion theory and solution strategies to a number of stochastic processes of interest. Anomalous diffusion by the fractional Fokker-Planck equation and Lévy stable processes are studied by Johan Anderson and Sara Moradi in the fourth contribution. They consider the motion of charged particles in a 3-dimensional magnetic field in the presence of linear friction and of a stochastic electric field. Analysis of low-frequency instabilities in a low-temperature magnetized plasma is presented by Dan-Gheorghe Dimitriu, Maricel Agop in the fifth chapter. The authors refer to experimental results of the Innsbruck Q-machine and provide an analytical formulation of the related theory. In chapter six, Stefan Irimiciuc, Dan-Gheorghe Dimitriu, Maricel Agop propose a theoretical model to explain the dynamics of charged particles in a plasma discharge with a strong flux of electrons from one plasma structure to another. The theory and applications of fractional derivatives in many-particle disordered large systems are explored by Z.Z. Alisultanov, A.M. Agalarov, A.A. Potapov, G.B. Ragimkhanov.