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Nota di contenuto	Introduction -- Quantum Effects in a Domain Wall of Magnetic Stripe Domain with Kink-type Solitons in the Form of Vertical Bloch Lines -- Thermodynamic Properties of Cylindrical Ferromagnetic Nanowire with a "Kink" Type Soliton in the Form of Transverse Domain Wall -- Magnetocaloric Effect in Cylindrical Ferromagnetic Nanowire with a "Kink" Type Soliton in the Form of Transverse Domain Wall -- Cylindrical Ferromagnetic Nanowire with a Point Soliton in the Form of a Bloch Point.

Sommario/riassunto

This book is based on a course of lectures aimed at undergraduate and graduate students studying materials science and welding at the E.O. Paton Institute of Materials Science and Welding National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute." The book is divided into four parts, each focusing on various aspects of magnetic solitons in ferromagnetic nanosystems. The first two parts of the book cover the quantum and thermodynamic properties of uniaxial ferromagnetic films with strong magnetic anisotropy and cylindrical nanowires made of different chemical compositions (ferrite-garnet, iron, nickel). These properties are related to the presence of "kink" solitons, which are vertical Bloch lines (BLs) and domain walls (DWs) of transverse type, respectively. The third part of the book discusses the effect of thermal motion of transverse-type DWs on the magnetocaloric effect in cylindrical iron and nickel nanowires. The fourth part of the book explores the conditions that lead to structural transitions between different types of DWs, including transverse, asymmetric, and DWs with a Bloch point (point soliton). Each part of the book is summarized at the end, highlighting the main results presented. Overall, the book is designed to provide students with a comprehensive understanding of magnetic solitons in ferromagnetic nanosystems and their associated quantum, thermodynamic, and structural properties.
