

SPINTRONICS. BASIC PHENOMENA. TRENDS
OF DEVELOPMENT

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S u m m a r y

The paper describes the physical basics of spintronics – a field on the boundary of physics and electronics which studies the ways to control spin states of electrons in solid-state systems and proposes the methods of fabrication of devices on the basis of the revealed effects and phenomena. Authors' view on the history of the development of this field is presented. The work reviews the methods of generation, manipulation, and detection of the spin polarization of charge carriers in semiconductors, metals, magnetic and nonmagnetic objects on the nanometer scale. The ways of electric and magnetic controls over the spin polarization of an ensemble of charge carriers are described. The mechanisms of relaxation of a system of mobile spins are considered. The requirements to the parameters of materials which are used (or will be used) in the fabrication of elements and devices of spintronics are given. The analysis and classification of magnetic materials related to spintronics are presented.