Belarusian State University
of Informatics and Radioelectronics
R&D Department
BSUIR, 6, P. Brovki Str., Minsk 220013, Republic of Belarus

# Theoretical and experimental study of methods for controlling magnetic anisotropy in two-dimensional systems

**Key research objectives:**

- Determine the electronic properties of normal and deformed nanoscale magnetic systems in two-dimensional and bulk crystal structures;
- Calculate the magnetic anisotropy energies for normal and deformed systems;
- Identify ways to control the magnetic anisotropy energy;
- Conduct experimental studies for the materials and structures under consideration.

**Relevance of the research:**

The main problem in the development of spintronic devices is the search for conditions and mechanisms that maximize the magnitude of magnetic anisotropy. In ferromagnetic thin films, the main source of magnetic anisotropy energies (MAE) is considered to be magnetocrystalline anisotropy (MAE), which occurs due to the spin-orbit coupling (SOC). However, 3D transition metals, which are used in devices that operate on the effect of tunnel magnetoresistance, usually exhibit a weak SOC.

An increase in the MAE in thin films can be achieved due to more localized surface states and quantum constraints, including lattice deformation, composition modification, the use of different substrates, the use of different synthesis methods, the use of surface adsorbents and an external electric field.

**Type of collaboration**

research cooperation

**Key words**

anisotropy, magnetic, modeling, energy

**Contacts**

**Head of research**
Viktor Stempitsky
PhD, Associate Professor
vstem@bsuir.by

**Technology Transfer**
science@bsuir.by