Some Problems for X-ray Spectroscopy of Iron-Containing Magnetic Materials

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Iron is one of the most common elements. The constantly high interest of researchers in iron compounds is observed in various fields of physics, chemistry, biology and medicine. And primarily this is due to the variety of magnetic properties observed in these compounds, for example, in a new multiferroics, in particular, iron-containing langasites of the $A_3MFe_3X_2O_{14}$ (A = Ba, Sr; M = Sb, Nb, Ta; X = Si, Ge) family and rare-earth ferroborates $RFe_3(BO_3)_4$ (R = Y, La - Lu), as well as magnetic nanowires (diameter 30 - 500 nm) of solid solutions of iron and other 3*d* metals.

Multiferroics showing simultaneously ferroelectric and magnetic ordering, are of especial interest from the point of view of application in prospective spintronic and magnetooptical devices, and also in devices for recovery of the electric energy and the systems of alternative energetics. Nanowires showing strong magnetic anisotropy and complex magnetic dynamics may find application for magnetic sensors, spintronic devices, hydrogen fuel cell electrodes, and for biomedical technologies, including antitumor therapy.

We assume that the use of the new capabilities of the upgraded ESRF beamlines will allow obtaining new unique experimental data in our studies of iron-containing langasites, rare-earth ferroborates and magnetic nanowires presented in this report.

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