Physics Colloquium

Thin-film half-metallicity and hexagonal phases in Heusler compounds

Pavel Lukashev
Assistant Professor
Department of Physics
University of Northern Iowa

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Half-metals with high Curie temperature are ideal candidates for applications in spin-based electronics – an emerging technology utilizing a spin degree of freedom in electronic devices. For practical applications, Heusler type materials are especially attractive, since most of them demonstrate higher Curie temperatures as compared to other reported half-metals. Yet, for nano-size devices, one has to take into account possible modification of electronic structure in thin-film geometry, due to the potential presence of surface/interface states. It has been shown that typically these states have a detrimental impact on half-metallicity, i.e. their presence results in reduced spin-polarization. Besides, most of the reported Heusler alloys are cubic, which limits their applicability in systems where large magnetic anisotropy is needed. In this talk, I will address these two issues, and show that a judicious choice of the termination surface may result in thin-film half-metallicity, while the hexagonal phase can be stabilized by manipulating the stoichiometry of the compound.

Everyone Welcome! Refreshments Provided.