

PHYSICS COLLOQUIUM

Perpendicular magnetic anisotropy in half-metallic thin-film Co_2CrAl

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Magnetocrystalline anisotropy (MCA) is one of the key parameters investigated in spin-based electronics (spintronics), e.g. for memory applications. In this work, first-principles calculations are employed to study MCA in thin film full Heusler alloy Co_2CrAl . This material was studied in the past and has been reported to exhibit half-metallic electronic structure in bulk geometry. In our recent work, we showed that it retains a 100% spin-polarization in thin-film geometry, at CrAl atomic surface termination. Here, we show that the same termination results in a robust perpendicular magnetic anisotropy, while Co surface termination not only destroys the half-metallicity, but also results in in-plane magnetization orientation. To the best of our knowledge, this is one of the first reports of half-metallic thin-film surface with perpendicular magnetic anisotropy. This result may be of interest for potential nano-device applications, and may stimulate a further experimental study of this and similar materials.

March 31, 2021

4:00 pm

Zoom Meeting

Everyone Welcome!

