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Growth, structural, and magnetic properties of single-crystal full-Heusler Co_2TiGe thin films¹ JOHN LOGAN, TOBIAS BROWN-HEFT, SEAN HARRINGTON, NATHANIEL WILSON, ANTHONY RICE, CHRIS PALMSTROM, Univ of California - Santa Barbara — Recent predictions have suggested that full-Heusler ferromagnetic Co_2TiGe may provide a model system for the observation of time-reversal breaking Weyl and nodal line semimetallic behavior. However, to date, few studies have examined the growth of high-quality single crystal thin films of Co_2TiGe . Consequently, this work presents the growth of Co_2TiGe thin films by molecular beam epitaxy on conductive n-InP (001) substrates as well as insulating MgO (001) substrates. The surface morphology, structural quality, and magnetic behavior are examined by reflection high-energy electron diffraction, scanning tunneling microscopy, x-ray diffraction, and SQUID magnetometry. The results reveal epitaxial smooth Co_2TiGe thin films with a terraced layer-by-layer growth mode, a saturation magnetization of ~ 1.8 B/formula unit, and a Curie temperature of ~ 375 K. The easy axis was found to lie in the [110] direction but magnetometry also reveals that there is only a small difference in energy between the [110] and [010] magnetization directions, in agreement with theory calculations.

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John Logan
Univ of California - Santa Barbara

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