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Growth of Cr_2CoGa and inverse Heusler thin films using Molecular Beam Epitaxy[1] MICHELLE JAMER, MATTHEW DECAPUA, GABRIEL PLAYER, DON HEIMAN, Northeastern University — Theoretical calculations have predicted the existence of inverse Heusler compounds that exhibit zero-moment magnetization while retaining their half-metallicity. These unique compounds have been labeled spin gapless semiconductors (SGS), where the density of states (DOS) can behave as a half-metal or gapless semiconductor.[1] There is a special interest for zero-moment SGS compounds since traditional antiferromagnets cannot be spin-polarized.[2] Such compounds are experimentally attractive for future spintronic devices due to their large magnetic transition temperature (400-800 K).[3] This work focuses on zero-moment inverse Heusler compounds including Cr_2CoGa and Mn_3Al. Thin films have been grown using MBE and their magnetic, structural, and electrical properties of these compounds have been characterized by various techniques, including XMCD and magnetometry. The atomic moments are found to be large, but significant cancellations lead to small average moments. [1] M.E. Jamer, B.A. Assaf, T. Devakul and D. Heiman, Appl. Phys. Lett. **103**, 142403 (2013). [2] M.E. Jamer, B.A. Assaf, G.E. Sterbinsky, D. Arena, L.H. Lewis, A.A. Saúl, G. Radtke, D. Heiman, Phys. Rev. B **91**, 094409 (2015). [3] M.E. Jamer, L.G. Marshall, G.E. Sterbinsky, L.H. Lewis, D. Heiman, J. Magn. Magn. Mater. (2015).

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