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Properties of Heusler alloy $Co_2Cr_{1-x}Fe_xAl$ epitaxial thin films RAJESH KELEKAR, BRUCE CLEMENS, Stanford University — We have studied properties of thin films of the new compound Heusler alloy $Co_2Cr_{1-x}Fe_xAl$. Recently, calculations have shown ordered compounds with small amounts of Fe doping to be half-metallic, and a magnetoresistance of approximately 30% has been measured in bulk polycrystalline samples by others. Using physical vapor deposition, we have grown $Co_2Cr_{1-x}Fe_xAl$ epitaxially on MgO. Our results show that the films are highly disordered and have a reduced magnetization as compared to the bulk and to theoretical predictions. Studies of films incorporated into current in plane spin valves show relatively large giant magnetoresistances, especially for a Heusler alloy. Recent results also indicate the presence of a large spin orbit coupling, which is unusual for a transition metal system.

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