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Current-Perpendicular-to-Plane (CPP) Magnetoresistance at 4.2K of spin-valves with the half-metal Co(2)Fe(Al(0.5)Si(0.5)) and Permalloy[1] RAKHI ACHARYYA, REZA LOLOEE, WILLIAM PRATT, JACK BASS, Physics Department, Michigan State University, East Lansing, MI 48824 — There is interest in current-perpendicular-to-plane (CPP) magnetoresistance (MR) in spin-valves containing half-metallic Heusler alloys such as Co(2)FeAl((0.5)Si(0.5)) (CFAS) [1]. Onto [001] oriented MgO substrates, we sputter epitaxially [001] oriented layers of 150-nm-thick Nb, 10-nm-thick Cu, and chosen thickness CFAS. We complete a spin-valve with 25 nm of Cu, 24 nm of Py = Ni(84)Fe(16), 10 nm of Cu, 25 nm of Nb, and 15 nm of a Au capping layer. With optical lithography and Ar-ion milling, we make 25 micron radius pillars insulated with in-situ deposited SiO. Finally, we lightly ion mill the Au surface and deposit a 150 nm thick Nb cross-strip, then covered by 5 nm of Au. The Nb strips superconduct at our measuring temperature of 4.2K, giving uniform current flow. We will describe how the CPP-MR varies with thicknesses of CFAS ranging from 2 nm to 20 nm. We hope to describe additional studies with Ag instead of Cu and with pinned Py layers.

[1] T.M. Nakatani et al., Appl. Phys. Lett. **96**, 212501 (2010).

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Jack Bass
Physics Department, Michigan State University, East Lansing, MI 48824

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