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**Enhancement of In-Plane Magnetic Anisotropy Through Compensation in $Ga_{1-x}Mn_xP$:S** P.R. STONE, O.D. DUBON, University of California, Berkeley and Lawrence Berkeley National Lab, K.M. YU, J.W. BEEMAN, Lawrence Berkeley National Lab, C. BIHLER, M.S. BRANDT, Walter Schottky Institut, Technische Universitat Munchen — $Ga_{1-x}Mn_xP$ is a ferromagnetic semiconductor (FS) in which exchange is mediated by localized holes [Scarpulla *et al.*, Phys. Rev. Lett. **95,** 207204 (2005)]. As is the case for the prototypical FS $Ga_{1-x}Mn_xAs$, there exists a uniaxial magnetic anisotropy between in-plane <110>-type directions with the magnetic easy axis lying near the in-plane [1-10] direction [Bihler *et al.*, Phys. Rev. B **75,** 214419 (2007)]. Here we report the effect of compensation of Mn acceptors by sulfur donors on the in-plane uniaxial magnetic anisotropy in $Ga_{1-x}Mn_xP$ as measured by both ferromagnetic resonance (FMR) and SQUID magnetometry. Raising the S concentration increases the magnitude of the uniaxial magnetic anisotropy between in-plane <110>-type directions. While the [1-10] direction remains the easy axis in the plane of the film, "wasp-waisted" hysteresis loops develop in the [110] direction as the S concentration increases. The wasp-waisted loops are modeled whereby magnetization reversal occurs by a combination of coherent spin rotation and noncoherent spin switching. Finally, by comparing FMR and SQUID data we extract domain wall formation energies as a function of compensation.

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