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Successive Magnetic Transitions of the Kagome Plane and Field-Driven Chirality in $BaMn_{2.49}Ru_{3.51}O_{11}$[1] LANCE DE LONG, LARYSA SHLYK, SEAN PARKIN, University of Kentucky — The magnetization of single-crystal $BaMn_{2.49}Ru_{3.51}O_{11}$ exhibits anomalies at temperatures $T_1 = 183$ K, $T_2 = 171$ K and $T_3 = 128$ K, which signal complex magnetic order induced by competing ferro- and antiferro-magnetic correlations, and magnetic frustration within the Kagome (hexagonal **ab-**) plane. The T_2- and T_3-anomalies and unconventional transverse magnetoresistance are observed only for magnetic field **H** applied in the Kagome plane. We conclude a topological Hall effect (THE) is generated by non-zero scalar chirality K_S of spins canted out of the Kagome plane, but is suppressed in a collinear structure induced by only modest in-plane fields. $BaMn_{2.49}Ru_{3.51}O_{11}$ is a unique example of an unusually large and anisotropic THE in a magnetically ordered state. The THE is driven by nonzero scalar spin chirality and can be controlled by unusually modest applied fields $\mu_o H < 1$ T, implying low-field alteration of scalar spin chirality may provide a new way to control electronic properties in magnetic materials having requisite non-centrosymmetric structure.

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