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Giant Anomalous Hall Effect in (Ba,Sr)$T_{2+x}Ru_{4-x}O_{11}$ (T=Fe,Co,Mn) Ferrites[1] LANCE DELONG, LARYSA SHLYK, University of Kentucky — Hexagonal R-type ferrites (Ba,Sr)$T_{2+x}Ru_{4-x}O_{11}$ are promising spintronic materials that exhibit collinear ferrimagnetic order at unusually high critical temperatures $T_C \leq 490$ K for Fe-bearing compositions, and an in-plane, "all-in/all-out" order at T_C's $<<$ 300 K due to frustrated antiferromagnetic interactions within the Kagome basal plane in metallic Co or Mn compositions. A strong, non-monotonic field dependence of the anomalous Hall effect is observed in metallic ferrites, which is generated by non-zero scalar spin chirality and the Berry phase acquired by carriers moving in the "topologically nontrivial" spin background of the Kagome plane. The FM semiconductor $BaFe_{3.4}Ru_{2.6}O_{11}$ (T_C = 440 K) exhibits a giant Hall resistivity = 77 $\mu\Omega$-cm at 300 K, with a low-temperature sign change and monotonic field dependence that are consistent with a strong Berry phase curvature (gauge field) acquired by carriers in momentum space.

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