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Anomalous Hall Resistivity and Magnetization of $\text{Sm}_{1-x}\text{Gd}_x\text{Al}_2$

Y. Y. XUE, F. CHEN, Y. Q. WANG, Y. Y. SUN, R. L. MENG, C. W. CHU¹,
Texas Center for Superconductivity and Advanced Materials, University of Houston,
Houston, TX 77204-5002 — Both the magnetization M and the anomalous Hall
resistivity, ρ_{xy}^{an} , of $\text{Sm}_{1-x}\text{Gd}_x\text{Al}_2$ with $0 < x < 0.02$ were measured. Similar to the
 M , the ρ_{xy}^{an} can be separated into a ferromagnetic component ρ_{xy}^{FM} and a Van Vleck-
like contribution ρ_{xy}^{VV} . When the Van Vleck susceptibility appears to be independent
of the spin ordering, however, the ρ_{xy}^{VV} changes significantly through the magnetic
transition, which may be understood within the chirality models. A very sharp sign
change of ρ_{xy}^{FM} , which is a rough measure of the ordered spins, was observed for the
magnetic fields above 0.5 T at a compensation temperature T_{comp} where the M dips
near the minimum in the field-cooling procedure. On the other hand, the amplitude
 $|\rho_{xy}^{FM}|$ shows no noticeable change across T_{comp} and is insensitive to the Gd-doping.
The spin contribution to the M , therefore, is the same across T_{comp} and changes
only smoothly with the doping.

¹Also at: Lawrence Berkeley National Laboratory, Hong Kong University of Science
and Technology

Yuyi Xue
TcSAM, University of Houston, Houston, TX 77204-5002

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