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Magnetic Ordering in $GdAuAl_4Ge_2$ and $TbAuAl_4Ge_2$: layered compounds with triangular lanthanide nets[1] K. FENG, NHMFL-FSU, I. A. LEAHY, U. Colorado at Boulder, K. WEI, NHMFL, W.L. NELSON, O. OLADEHIN, J.R. GALEANO-CABRAL, NHMFL-FSU, M. LEE, U. Colorado at Boulder, R. BAUMBACH, NHMFL-FSU — We recently reported results for the weakly correlated f-electron metal $CeAuAl_4Ge_2$, where the atomic arrangement of the cerium ions creates the conditions for possible geometric frustration.[Z. Sheng,.et al, 2017] Although this compound does not show clear evidence for unusual behavior, this motivated us to investigate the broader lanthanide series $Ln AuAl_4Ge_2$ (Ln = Pr - Tm) where magnetic interactions might be enhanced. We used an aluminum molten metal flux method to produce the single crystals throughout the series, and powder X-ray diffraction measurements show (1) the crystals form in the same rhombohedral structure as the Ce analogue and (2) the obtained lattice parameters (a and c) and unit cell volume v are consistent with a trivalent lanthanide contraction. Here we will focus on the Ln = Gd and Tb examples, where magnetization, heat capacity, and electrical transport measurements reveal complex magnetic ordering at low temperatures. Evidence is also seen for magnetic frustration in the form of strong magnetic fluctuations (observed in the heat capacity) at temperatures well above the bulk ordering temperatures. Finally, we will present the temperature - magnetic field phase diagrams, which each feature several regions with distinct ordered states.

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