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Ferromagnetic to antiferromagnetic transition in the $Fe_{1/3}(Ta_{1-x}Nb_x)S_2$ layered dichalcogenides CHIH-WEI CHEN, JESSE ADAMS, WILL HARDY, DOUGLAS NATELSON, EMILIA MOROSAN, Physics & Astronomy Department, Rice University — $Fe_{1/3}TaS_2$ is known to order ferromagnetically with $T_C = 40$ K, while the isostructural Nb compound orders antiferromagnetically below $T_N = 40$ K. The Ta-Nb solid solution provides an opportunity to search for a quantum phase transition (QPT) as we tune the magnetic order in $Fe_{1/3}TaS_2$ by doping between T = Ta and T = Nb. We will analyze magnetization, specific heat, and resistivity data to search for signatures of a $T = 0$ transition (QPT). Additionally, we will explore the magnetoresistive effects in these Fe-intercalated TS_2 (T = Ta, Nb) and compare with our previous results on Fe_xTaS_2 ($x = 0.25$, 0.28). Small departures from the superstructure Fe compositions ($x = 0.25$, 0.33) in Fe_xTaS_2 resulted in two orders of magnitude increase in the magnetoresistance.

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