Determination of complex magnetism in a homologous series of compounds. R.W. MCCALLUM, Y. JANSSEN, TA. LOGRASSO, K.A. GSCHNEIDNER, JR., V.K. PECHARSKY, B.N. HARMON, Ames Laboratory, Iowa State University, Ames IA 50011 — Pr\(_{(n+1)(n+2)}\)Ni\(_n(n-1)+2\)Si\(_n(n+1)\), where n = 2, 3, and 4, forms a homologous series of hexagonal compounds whose basic structural unit is a trigonal prism of Pr atoms with its axis parallel to the c-axis. Between 100 and 400 K, their dc susceptibility, \(\chi_s\) measured with \(H||c\) and \(H\perp c\) on a single crystal follows a Curie-Weiss law. In all compounds, the component of \(M||c\) orders ferromagnetically with \(T_c\) increases with n. For \(H\perp c\), a peak is observed in the low-field M vs T plots below \(T_c\) suggesting antiferromagnetic order. For \(H\perp c\) at 5 K, all three compounds exhibit a metamagnetic transition between 2 T and 3 T. Based on the systematics of the properties of the members of the series, a model for site specific interactions has been developed for comparison with first principles calculations.

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