Determination of complex magnetism in a homologous series of compounds.\textsuperscript{1} 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 — \( \text{Pr}_{(n+1)(n+2)}\text{Ni}_{n(n-1)+2}\text{Si}_{n(n+1)} \), 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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