Magnetic properties of \( R_2\text{PdSi}_3 \) \((R = \text{heavy rare earth})\) compounds

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Abbreviations

\( \mu_0 \) permeability of the free space \((4\pi \cdot 10^{-7} \text{ Vs/Am})\)

\( \mu_B \) Bohr magneton \((9.274\cdot10^{-24} \text{ J/T})\)

\( \mu_0 H \) (external) magnetic field \((\text{in Tesla})\)

\( M \) magnetisation \((\text{in Tesla})\)

\( B \) magnetic inductance \((\text{in Tesla})\)

\( \mu \) magnetic moment \([\mu_B/\text{ion}]\)

\( \chi \) susceptibility \((\text{Volume susceptibility, unit free in SI})\)

\( \chi_{ac} \) ac-susceptibility

\( a \) vector

\( a \) norm of vector or in general a scalar

\( n, m \) integer values \(0, 1, 2, \ldots\)

\([u, v, w]\) vector in real space

\((H, K, L)\) vector in reciprocal space

\( \{h, k, l\} \) cohort of symmetrical equivalent reflections

\((H0L)\) reciprocal plane spanned by the vectors \((H, 0, 0)\) and \((0, 0, L)\)

\( V_{EZ} \) volume of the unit cell

r. l. u. relative lattice units

RKKY Rudermann-Kittel-Kasuya-Yosida

CEF Crystal-Electric-Field

DM Dzyaloshinski–Moriya

PM paramagnetic

FM ferromagnetic

AFM antiferromagnetic

CEF crystal electric field

LRO long-range order

SRC short-range correlation(s)

iS-LRO incommensurate short-to-long-range order

cS-LRO commensurate short-to-long-range order

\( T_N \) Néel temperature

\( T_2 \) second ordering temperature

\( T_F \) ordering temperature of the field-induced FiM phase

\( k_B \) Boltzmann constant \((1.32 \cdot 10^{-23} \text{ J/K})\)

\( H_D \) magnetic field associated to equilibrium condition \((\text{in Tesla} \ (H_D = \mu_B H))\)

\( H_S \) magnetic field associated to a short-to-long range ordered transition \((\text{in Tesla})\)

\( H_c \) critical magnetic field of the magnetic ground state \((\text{in Tesla})\)

\( H_{c2} \) magnetic field for parallel alignment of the magnetic moments \((\text{in Tesla})\)

ILL Institut Laue-Langevin

LLB Laboratoire Leon Brillouin

HZB Helmholtz-Zentrum für Materialen und Energie Berlin

FRM-II Forschungsneutronenquelle Heinz Maier-Leibnitz

APS Advanced Photon Source

ESRF European Synchrotron Radiation Facility