

Neutron diffraction study of CeRh_2Si_2 under pulsed magnetic field

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We present a single crystal neutron diffraction study of the heavy-fermion antiferromagnet CeRh_2Si_2 performed in high fields of up to 30 T. This system is antiferromagnetic below $T_N = 36$ K, with a change of magnetic state below $T_{1,2} = 26$ K [1]. Under a magnetic field a third antiferromagnetic phase, AF3 is stabilized between $\mu_0 H_{2,3} \approx 25.5$ T and $\mu_0 H_c \approx 26$ T, above which the system is polarized paramagnetically [2]. A new long-duration (>100 ms) and high duty cycle, 40-T conical pulsed magnet developed by the LNCMI-Toulouse, the CEA Grenoble and the ILL Grenoble, has been used on the triple-axis spectrometer IN22 (CRG-CEA at the ILL). The magnetic structure in AF3 phase has been determined here. In the discussion we will compare the effects of pressure and magnetic field on CeRh_2Si_2 .

[1] S. Kawarazaki, M. Sato, Y. Miyako, N. Chigusa, K. Watanabe, N. Metoki, Y. Koike, and M. Nishi, *Phys. Rev. B* **61** 4167 (2000).

[2] W. Knafo, D. Aoki, D. Vignolles, B. Vignolle, Y. Klein, C. Jaudet, A. Villeneuve, C. Proust, and J. Flouquet, *Phys. Rev. B* **81** 094403 (2010).