SEMINARIUM Z MAGNETYZMU I NADPRZEWODNICTWA

Uprzejmie zawiadamiamy, że w **środę**

24 października 2018 r., o godz.10:00

w sali 203 (bud. 1) odbędzie się seminarium, na którym

mgr Oleksii Bludov

B. Verkin Institute for Low Temperature Physics and Engineering of NAS of Ukraine

wygłosi referat na temat:

„Magnetic properties of $GdCr_3(BO_3)_4$"

Analysis of experimental data on magnetic susceptibility, magnetization, electrical polarization, heat capacity, and resonance absorption of microwave radiation of the $GdCr_3(BO_3)_4$ single crystal will be presented.

It is established that the gadolinium chromium borate is an easy-plane antiferromagnet below $T_N = 7.15 \pm 0.05$ K. Above 30 K, the $\chi(T)$ obeys the Curie-Weiss law with the effective magnetic moment of $10.6 \pm 0.1\ \mu_B$ per formula unit (the expected value is 10.4 μ_B) and the paramagnetic Curie temperature 7 ± 1 K. It was shown that at $T > T_N$, the magnetic susceptibility $\chi(T)$ of $GdCr_3(BO_3)_4$ can be described well by using a one-dimensional spin model for a system of the coupled chains of the Cr^{3+} ions with ferromagnetic intrachain exchange interactions $2J/k$ = -13,6 K and antiferromagnetic interchain exchange interactions $2J'/k$ = +0,72 K. Manifestation of the low dimensionality was found in the magnetic contribution to the heat capacity.

Metamagnetic phase transition at around 4 T was detected below T_N. The transition reveals itself by a sharp increase of the sample magnetization and the electrical polarization. The transition field is almost independent of the direction of the applied magnetic field. The effective exchange field was estimated to be $2H_E \approx 18$ T. The AFMR gap was determined to be equal to 25.5±0.5 GHz. The effective anisotropy field H_A was evaluated as ~ 0.05 T.

A magnetic phase diagram of $GdCr_3(BO_3)_4$ was constructed. A nonmonotonic dependence of the Néel temperature on the external magnetic field was found. The spin structures of the low field and high field magnetic phases were proposed.

Serdecznie zapraszamy

Roman Puźniak
Henryk Szymczak
Andrzej Szewczyk