Magnetic ordering of $Co_{0.33}NbS_2$ under pressure

Petar Popčević[1], Igor Smiljanić[1], Ante Bilušić[1,2], Ana Smontara[1], Ivo Batistić[3], Helmuth Berger[4], Jaćim Jaćimović[4], László Forró[4], Neven Barišić[1], Edo Tutiš[1]

[1]*Institu za fiziku, Zagreb, Croatia*
[2]*University of Split, Croatia*
[3]*Faculty of Science, University of Zagreb, Croatia*
[4]*École polytechnique fédérale de Lausanne, Switzerland*

2H-NbS_2 is a layered material that has a superconducting transition at 6 K and this transition is pressure independent.[1] Upon intercalation of Co atoms between NbS_2 metallic layers superconductivity is suppressed. Co atoms in $Co_{0.33}NbS_2$ form triangular lattice and at ambient pressure there is antiferromagnetic ordering at 26 K. Hidrostatic pressure suppresses the ordering to lower temperatures[2] and at $p = 2$ GPa magnetic ordering disappears. The ordering mechanism is not fully understood yet, although super-exchange and RKKY interactions are natural candidates. At pressures above 3 GPa minimum in resistivity followed by logarithmic rise of resistivity with lowering temperature appears. This indicates Kondo screening of magnetic moments on Co ions and Kondo spin liquid formation. No superconductivity was found between these two phases down to dilution temperatures.[3] Disappearance of magnetic ordering with pressure is confirmed with elastic neutron scattering experiment and phase diagram of $Co_{0.33}NbS_2$ is presented.

[1] R. E. Jones, *et al.*, Phys. Rev. B **6** (1972) 835.

[2] N. Barišić, *et al.*, Phys. Rev. B **84** (2011) 075157.

[3] J. Jaćimović, *et. al.*, to be published.