



Invitation

LMU-Seminar

Title: Pressure evolution of the magnetic order: muon-spin rotation study of the binary pnictides CrAs, MnP, and FeSe

Speaker: Dr. Rustem Khasanov (PSI, Switzerland)

Time: Friday, October 7, 2016 at 10:15

Place: WBBA/008

Abstract:

CrAs was found to be characterized by a long-range helimagnetic order with a propagation vector \mathbf{Q} parallel to the c -axis and with the magnetic moments lying in the ab plane. The magnetism remains bulk up to $p \approx 3.5$ kbar while its volume fraction gradually decreases with increasing pressure until it vanishes at $p \approx 7$ kbar. At 3.5 kbar superconductivity abruptly appears with its maximum $T_c \approx 1.2$ K which decreases upon increasing the pressure.

In MnP a ferromagnetic state as well as two incommensurate helical states (with propagation vectors \mathbf{Q} aligned along the crystallographic c - and b - directions, respectively) which transform into each other through first order phase transitions as a function of pressure and temperature were identified.

Experiments on a FeSe single crystal oriented along [101] allow one to identify the pressure-induced magnetic order as corresponding either to a collinear (single-stripe) anti-ferromagnetic order as observed in parent compounds of various FeAs-based superconductors or to a Bi-Collinear order as obtained in the FeTe system, but with the Fe spins turned by 45 degrees. The value of the magnetic moment per Fe atom was estimated to be 0.13-0.14 μ_B at $p \approx 19$ kbar.

Our results demonstrate the capability of the μ SR technique to identify various type of magnetic order as well as to follow the evolution of the magnetic structure as a function of temperature and/or pressure.