# STRONG HUBBARD CORRELATIONS AND WEAK MAGNETISM IN FeSi

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9.7 cm

The comprehensive study of a wide temperature range DC- and AC-transport and magnetization has been carried out in magnetic fields up to 120 kOe in the almost magnetic narrow-gap cubic semiconductor FeSi. The analysis of the experimental data obtained on high quality single crystals of iron monosilicide revealed that the Mott-Hubbard scenario of metal-insulator transition with on-site Coulomb interaction U$\leq$3D (D is the band half-width) is likely to be the most appropriate description of the low temperature anomalies in transport, optical and thermodynamic characteristics in this strongly correlated electron system (N.E.Sluchanko et al., Phys. Rev. B 65 (2002), 064404). Temperature lowering induces density of states renormalization and formation of a short range ($\sim$10Å) spin-polarons. This process is followed by the onset of coherent spin-fluctuations and transformation of the low carrier density ($\sim 10^{17}$ cm$^{-3}$) heavy fermions into ferromagnetic microdomains at $T_c \approx 15$K. Detailed magnetic, magnetoresistance and microwave magnetoabsorption measurements allowed to deduce a low temperature magnetic T-H phase diagram of FeSi and estimate an exchange magnetic field in ferromagnetic microregions: $H_{ex} \approx 350 \pm 100$ kOe.

13.4 cm

**Subject category :**

3. Transition Metals, Alloys and Compounds

**Presentation mode :**
oral

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