Contribution ID: **136** Type: **Talk**

Superconducting and magnetic properties of the FeSe1-x system

Friday, 16 September 2011 10:20 (20 minutes)

We report on a detailed study of the electronic phase diagram of FeSe1−x under pressure by means of muon-spin rotation and AC magnetization. Whereas at low pressures the system is solely superconducting at low-temperatures, one observes the occurrence of a static magnetic order at a pressure of ⊠ 0.8GPa. For this pressure, bulk superconductivity coexists and competes on short length scales with the magnetic order below Tc. For pressures above 1GPa a remarkable enhancement of both the magnetic and the superconducting transition temperatures is observed. These unconventional properties establish FeSe1−x as one of the most intriguing superconducting systems investigated to date.

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Session Classification: Multiple Order Parameter Systems

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