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## Magnetism and superconductivity in the iron-based superconductors LiFeAs and NaFeAs

*Thursday, 15 September 2011 17:30 (30 minutes)*

The response of the superconductivity and structure of LiFeAs and NaFeAs to chemical substitutions has been probed using high-resolution X-ray diffraction measurements, magnetometry, and muon-spin rotation. The superconductivity is very sensitive to composition, with substitution of Fe by small amounts of Co or Ni in LiFeAs resulting in monotonic lowering of the superconducting  $T_c$  and the superfluid stiffness as the electron count increases. A similar effect is found in NaFeAs and it appears that electron count is the dominant factor. I will discuss the interplay and coexistence of superconducting, magnetic and structural order parameters in the latter system, where Co doping weakens the magnetism through both a suppression of  $T_N$  and a reduction in the ordered moment in the magnetically ordered phase. Further doping results in a magnetically disordered phase in which moment size continues to decrease and falls to zero at the same point as the structural distortion is removed. Our results suggest that magnetism drives the structural transition in NaFe $_{1-x}$ Co $_x$ As and that its disappearance coincides with a strengthening of the superconducting order.

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Plenary session

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Talk

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