

# The 58th MANA Special Seminar



## Effect of substitution within FeAs layer in iron arsenide superconductors

**Prof. Zhu-An Xu** (*Zhejiang University*)

We report systematic investigation on the superconductivity induced by Co, Ni, and P doping within the superconducting-active FeAs layers in 1111 and 122 systems. A dome-like doping dependence of  $T_c$  is observed for both Co and Ni doped systems, but “optimal” doping level is about  $x \sim 0.05$  in Ni-doped systems, only half of the optimal doping level ( $x \sim 0.1$ ) in Co doped systems. Meanwhile, the absolute value of thermopower increases quickly with either Co doping or Ni doping, similar to the case of F-doped 1111 phase, suggesting a correlation between  $T_c$  and thermopower. We also proposed an intrinsic Kondo effect picture to account for a logarithmic increase in resistivity at low temperatures for both parent compound and doped systems. By partial substitution of As by P, chemical pressure induced superconductivity is observed in 1111 and 122 systems. Measurements of Hall effect and thermopower indicate that P doping is like electron-type doping. All the results point to an itinerant picture of 3d electrons in the iron arsenides.

**Venue:** Seminar Room #431, MANA Bldg., Namiki

**Date:** Feb 3<sup>rd</sup> Tuesday      **Time:** 16:00-17:00

Contact: International Center for Materials Nanoarchitectonics (MANA), Nakata (ex. 8806)