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**Itinerant scenario of magnetism and superconductivity in iron-based superconductors** YU-ZHONG ZHANG, Shanghai Key Laboratory of Special Artificial Microstructure Materials and Technology, School of Physics Science and Engineering, Tongji University, MING-CUI DING, Shanghai Key Laboratory of Special Artificial Microstructure Materials and Technology, School of Physics Science and Engineering, Tongji University, HAI-QING LIN, Beijing Computational Science Research Center, Beijing 100084, China — We will show in this talk that magnetic and superconducting phases of iron-based superconductors can be systematically understood from itinerant weak coupling limit except for the K-doped iron selenides where Fe vacancy order plays dominant roles, FeTe where excess Fe in the interstitial is responsible for the unique bicollinear antiferromagnetic order, and LaFePO where superconducting state at low temperature comes out of competitions of two instabilities between  $(\pi,\pi)$  and  $(0,0)$  which show tendency towards collinear antiferromagnetic state and Néel ordered antiferromagnetic or ferromagnetic state, respectively. We also exhibit that Fermi surface nesting is not a necessary condition for the itinerant magnetism in multi-orbital systems.

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