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Competition Between Antiferromagnetism and Ferromagnetism in Sr_2RuO_4 Probed by Mn and Co Doping ZHIQIANG MAO, JOHN ORTMANN, JINYU LIU, JIN HU, Tulane University, M. ZHU, Michigan State University, JIN PENG, Tulane University, M. MATSUDA, Oak Ridge National Laboratory, XIANGLIN KE, Michigan State University — Spin-triplet superconductivity in Sr_2RuO_4 has attracted enormous interest. Like other unconventional superconductors, superconductivity in Sr_2RuO_4 is in close proximity to magnetic instability. Undoped Sr_2RuO_4 exhibits incommensurate antiferromagnetic (AFM) fluctuations, which can evolve into static, short-range AFM order via Ti doping. Moreover, weak ferromagnetic (FM) coupling in Sr_2RuO_4 has also been suggested by NMR/neutron scattering experiments and studies on $Ca_{2-x}Sr_xRuO_4$ and $Sr_{2-y}La_yRuO_4$. In this talk, we will report bulk static, short-range FM order in Sr_2RuO_4 triggered by $<2\%$ Co doping, showing superconductivity in Sr_2RuO_4 is much closer to FM instability than previously reported in $Ca_{2-x}Sr_xRuO_4$. We also find Mn doping can effectively establish incommensurate AFM order, with $T_N \sim 50$ K for 3% Mn doping. These new results highlight the important role of competing magnetic fluctuations in determining superconducting properties of Sr_2RuO_4[1].

[1] Ortmann et al., Scientific Report 3, 2950 (2013).

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