

Abstract Submitted
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Spin easy axis switching from the out-of-plane to in-plane direction driven by 2% Fe doping in $\text{Sr}_4\text{Ru}_3\text{O}_{10}$ ¹ PEIGANG LI, YANGLIN ZHU, JINYU LIU, YU WANG, ZHIQIANG MAO, Department of physics and engineering physics, Tulane University, New Orleans, LA, 70118 — $\text{Sr}_4\text{Ru}_3\text{O}_{10}$, a layered strongly correlated system, has been known as an itinerant ferromagnet with $T_C \sim 105$ K [1]; its spin easy axis lies along the c -direction. A puzzling phenomenon of its FM state is that a metamagnetic transition can be induced by in-plane field [1,2]. In this presentation, we will report that 2% Fe-doping in this material results in drastic changes in its FM properties: its spin easy axis switches from the out-of-plane to in-plane direction, whereas the metamagnetic transition takes place for the field aligned along the out-of-plane direction. These surprising phenomena could be attributed to strong lattice-orbital coupling. The possible scenario is that Fe acts as a strong scattering center, thus resulting in global structure distortion, which in turn leads to the change of the Ru $4d_{xy}$ and $d_{xz/yz}$ orbital states. [1] G. Cao, L. Balicas, W. H. Song, *et al. Phys. Rev. B* **68**, 174409(2003) [2] Z. Q. Mao, M. Zhou, J. Hooper, *et al. Phys. Rev. Lett.* **96**, 077205 (2006)

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Peigang Li
Department of physics and engineering physics, Tulane University, New Orleans, LA, 70118

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