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Field-induced magnetic phase transitions in Ti-doped Ca3Ru2O7 bilayer ruthenates M. ZHU, Department of Physics and Astronomy, Michigan State University, J. PENG, Z.Q. MAO, Department of Physics and Engineering Physics, Tulane University, K. PROKES, S. MATAS, Helmholtz Zentrum Berlin, D-14109 Berlin, Germany, T. HONG, Quantum Condensed Matter Division, Oak Ridge National Laboratory, X. KE, Department of Physics and Astronomy, Michigan State University — Bilayer ruthenate $Ca_3Ru_2O_7$ shows strong magnetic instability that depends sensitively on chemical doping and magnetic fields. Previously we have shown that [1] Ti doping induces Mott insulating ground state with a G-type antiferromagnetic (AFM) structure where nearest-neighbor spins align antiferromagnetically, a feature dramatically distinct from the metallic ground state with an AFM-b structure where the ferromagnetically aligned spins (pointing along the *b*-axis) within the bilayer are coupled antiferromagnetically along the *c*-axis. Here we report magnetic phases of the Ti-doped $Ca_3Ru_2O_7$ in a magnetic field revealed via neutron diffraction study. In sharp contrast to pure $Ca_3Ru_2O_7$ [2], below the metal-insulator transition we find a field-induced magnetic phase transition from G-type AFM to AFM-a with spins projected along the *a*-axis. Concomitantly, a sharp change in lattice parameters is observed, suggesting strong magnetoelastic coupling. The effect of such a field-induced phase transition on the magnetotransport property in the Ti-doped $Ca_3Ru_2O_7$ will be discussed as well. [1] X. Ke et al., Phys. Rev. B **84**, 201102 (R) (2011). [2] W. Bao et al., Phys. Rev. Lett. **100**, 247203 (2008).

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