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Novel spin-liquid behaviour in some Ir-based oxide systems[1]
A.V. MAHAJAN, T. DEY, Department of Physics, Indian Institute of Technology Bombay, Powai, Mumbai 400076, India, P. KHUNTIA, M. BAENITZ, Max Planck Institute for Chemical Physics of Solids, 01187 Dresden, Germany, B. KOTESWARARAO, F.C. CHOU, Center for Condensed Matter Sciences, National Taiwan University, Taipei 10617, Taiwan, A.A. OMRANI, H.M. RONNOW, Laboratory for Quantum Magnetism, Ecole Polytechnique Federale de Lausanne (EPFL), CH 1015, Switzerland — The 5d-transition metal based oxide systems are of current interest due to the prominence of spin-orbit coupling driving them to a Mott insulating state in spite of a small Coulomb repulsion energy U. We have recently investigated Ba3IrTi2O9 and Ba3YIr2O9 systems (with hexagonal arrangement of Ir) using x-ray diffraction, magnetization, heat capacity, and NMR. With a power-law temperature dependence of the low-T magnetic heat capacity, we find evidence of spin-liquid behavior in the former. Whereas the latter is magnetically long-range ordered below 4 K, it transforms to a cubic structure when reacted at 1273 K under a pressure of 8GPa. The high-pressure (HP) prepared sample, though with semiconductor-like resistivity, has (in addition to the phonon term) a T-linear heat capacity term with $\gamma = 10$ mJ/mol K^2 and a T-linear ^{89}Y NMR spin-lattice relaxation rate. We conclude that the HP phase exhibits spin-liquid behavior.

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