Pressure induced ferromagnetic spin glass transition in $R_2Mo_2O_7$ pyrochlores.

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Geometrically frustrated magnets are chemically ordered but the geometry of the lattice prevents first neighbour magnetic interactions to be satisfied simultaneously. In the pyrochlore lattice of corner sharing tetrahedra, exotic types of magnetic short range orders, such as spin liquids, spin ices, or chemically ordered spin glasses have been found [1]. The degeneracy of the magnetic ground state is so high that any perturbation may select a specific state and induce an original magnetic order. High pressure, which changes the energy balance between magnetic interactions can induce new magnetic states. A spectacular example is $Tb_2Ti_2O_7$ which remains spin liquid at ambient pressure down to 0.07K [2] but undergoes antiferromagnetic order under applied pressure or stress [3]. Pyrochlores $R_2Mo_2O_7$ (R=rare earth) undergo a ferromagnetic metal - insulating spin glass crossover transition with decreasing the rare earth ionic radius [4]. These compounds are interesting for material science as showing a giant anomalous Hall effect, attributed to the persistence of frustration in the ferromagnetic state [5]. We show that applying pressure induces a destabilization of the ferromagnetic state, which we studied a microscopic level by performing neutrons, muon, and X ray synchrotron data on the same sample under pressure. The first results of this study will be presented here.

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