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Magnetic Properties of LiFePO_4 under Hydrostatic Pressure

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LiFePO_4 (LFPO) is an archetypical and well-known cathode material [1] for rechargeable Li-ion batteries. However, its quasi-one-dimensional (Q1D) structure (see Figure) along with the Fe ions, LFPO also displays interesting low-temperature magnetic properties [2]. At ambient pressure LFPO displays an antiferromagnetic (AFM) spin order below $T_N = 53$ K and neutron scattering [3-5] have characterized that LFPO orders in a canted AFM ground state below T_N . Our team has previously utilized muon spin rotation (μ^+ SR) to investigate both magnetic order as well as Li-ion diffusion in LFPO [6] as well as nano-structured LFPO [7,8] and related compounds [9-11]. In this initial study we make use of high-pressure μ^+ SR to investigate effects on the low-T magnetic order. We find a clear decrease in T_N at $p = 20$ kbar and we can estimate that a complete suppression of magnetic order should appear around $p_c \approx 300$ kbar.

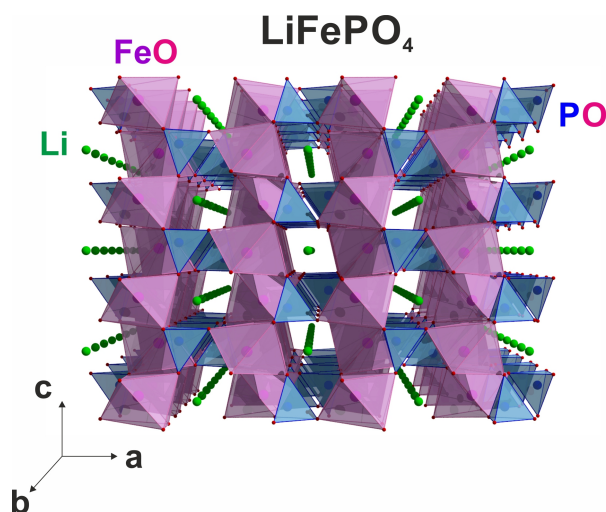


Figure 1:

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