Abstract Submitted
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Pressure-induced quantum phase transitions in a frustrated spin liquid[1] ALEXANDRA MANNIG, MATTHIAS THEDE, DAN HÜVONEN, MARTIN MÅNSSON, ANDREY ZHELUDEV, Neutron Scattering and Magnetism Group, Laboratory for Solid State Physics, ETH Zürich, Zürich, Switzerland, RUSTEM KHASANOV, ELVEZIO MORENZONI, Laboratory for Muon Spin Spectroscopy, Paul Scherrer Institut, Villigen, Switzerland — With the frustrated gapped spin-1/2 quantum antiferromagnet $(C_4H_{12}N_2)Cu_2Cl_6$ piperazinium hexachlorodicuprate (PHCC) we present an example of a pressure-induced quantum phase transition from the quantum spin liquid state to a magnetically ordered phase [1]. PHCC was investigated at hydrostatic pressures of up to 23.6 kbar with μSR techniques. The evaluation of the obtained data provided local field dependencies on temperature as well as pressure and allowed the mapping of a detailed P-T phase diagram of PHCC. Thus, the quantum critical point that separates the non-ordered phase and a magnetically ordered phase at low pressures was found to lie between 4.2 and 4.4 kbar, which disagrees with recent suggestions of inelastic neutron scattering studies. The oscillations of this magnetically ordered phase indicate an incommensurate structure. In addition, an unexpected second magnetically ordered phase that exhibits a different oscillation behavior and considerably higher saturation fields occured at around 14 kbar.

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