Spin-1/2 kagome lattice

The recent synthesis of the cupper based spin-1/2 kagome lattice herbertsmithite by the MIT chemistry group led by Daniel Nocera generated considerable activity in the field of HFM. However, its chemical formula $ZnCu_3(OH)_6Cl_2$ suggests that the Cu kagome planes are contaminated with Zn. This hampers the ability to draw information from experiments and the interpretation of experimental data is left unresolved. Recently, the same group has generated a perfect spin-1/2 kagome system without Zn.

We investigated this Zn-free-kagome using the low temperature facility in PSI-Switzerland. We had three continues days of beam-time and performed zero field, longitudinal field, and transverse field measurements. We scanned the temperature range form 0.1K to 6K and magnetic fields from zero to 3kG. Figure 1 shows, for example, muon rotation in a rotating reference frame of 900 G, at two different temperatures, and an applied field of 1000G. Clear variations in the rotation frequency and relaxation rate are observed.

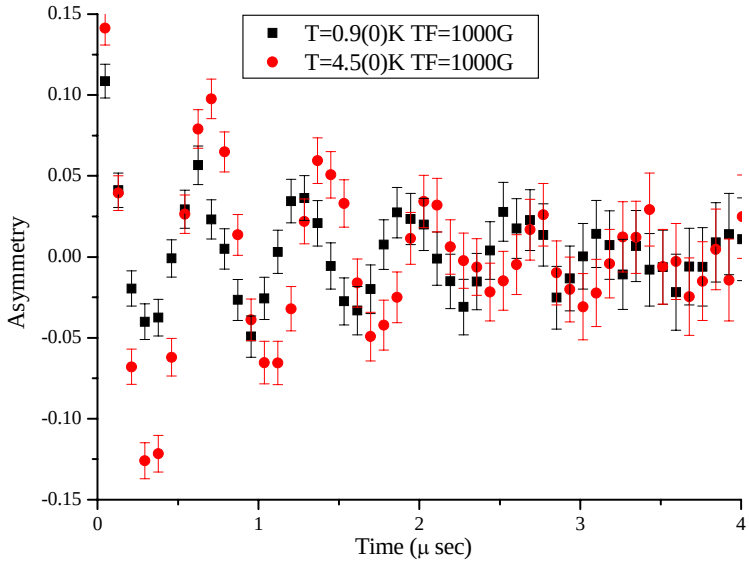

Figure 1

This data add to previous measurements in the general purpose spectrometer at PSI at high temperature taken in Sep 2008 and hopefully will lead to a publication.