Field-induced spin-solid phases in the spin liquids $\text{Tb}_2\text{Ti}_2\text{O}_7$ and $\text{Nd}_3\text{Ga}_5\text{SiO}_{14}$

LUIS BALICAS, National High Magnetic Field Lab, Florida State University, YOUNJUNG JO, HAIDONG ZHOU, EUN SANG CHOI, CHRISTOPHER WIEBE, National High Magnetic Field Laboratory, Florida State University, Tallahassee-FL 32306, USA — Here we report thermodynamic and magnetization measurements at zero and high fields in the pyrochlore $\text{Tb}_2\text{Ti}_2\text{O}_7$ and in the Kagome lattice $\text{Nd}_3\text{Ga}_5\text{SiO}_{14}$. In both compounds, previous neutron scattering studies did not reveal any form of magnetic ordering down to the lowest temperatures and have proposed these materials to display a spin-liquid ground state [1]. Here we show that heat capacity normalized by temperature down to $\sim 350$ mK confirms the absence of ordering. Furthermore, magnetization as a function of field at the lowest temperatures reveal the existence of an intermediary phase protruded between the zero field spin-liquid and the high-field spin-polarized state. In the case $\text{Nd}_3\text{Ga}_5\text{SiO}_{14}$it leads to a 1/2 magnetization plateau for fields along the inter-planar direction, similar to the one recently reported in the pyrochlore compound $\text{CdCr}_2\text{O}_4$ [2]. But for fields along the planes it displays a 1/3 plateau followed by a metamagnetic transition towards a value closer to 4/5. [1] J. S. Gardner et al. Phys. Rev. Lett. 82, 1012 (1999) ; J. Robert et al., ibid 96, 197205 (2006) [2] H. Ueda, Phys. Rev. Lett. 94, 047202 (2005).