Phase diagram of an easy-axis Kagome antiferromagnet under a magnetic field

XAVIER PLAT, FABIEN ALET, SYLVAIN CAPPONI, PIERRE PUJOL, Laboratoire de Physique Théorique, Université Paul Sabatier, Toulouse, KEISUKE TOTSUKA, Yukawa Institute for Theoretical Physics, Kyoto University

— We present a quantum Monte-Carlo (QMC) study of a spin-1/2 XXZ model, with second and third-neighbour terms, under a magnetic field on the Kagome lattice. This model, introduced in the zero field case by Balents, Fisher and Girvin [1], exhibits, in the easy-axis limit, a topological gapped Z2 phase with fractional excitation [2-4]. When adding a magnetic field, other gapped incompressible phases are stable for magnetizations 1/3 and 2/3 of its saturation value. Using state-of-the-art measurements, including recently developed tools to compute the topological entropy, we investigate the nature of these ground-states. Finally, we make some connection between these microscopic models and effective constrained models (such as quantum loop model or quantum dimer model respectively), which allow to provide a better understanding of the physical properties.