Non-magnetic defects in the classical Kagome bilayer antiferromagnet

ARNAB SEN, Boston University, KEDAR DAMLE, Tata Institute of Fundamental Research, Mumbai, India, RODERICH MOESSNER, Max-Planck-Institut für Physik komplexer Systeme, Dresden, Germany — We consider non-magnetic substitutions in the quasi two-dimensional Kagome bilayer lattice (relevant to experiments on SCGO $^1$) which consists of both triangular and tetrahedral units. Correlated defects, where impurities substitute for all but one spin on a “defective” triangle or tetrahedron, are particularly interesting in this context. The lone “orphan spin” $^2$ on the simplex acts like a paramagnetic spin as $T \to 0$ and induces a long-ranged spin texture around it $^3$ at zero temperature. We study such defects at low temperatures and magnetic fields by performing classical Monte-Carlo simulations. We also use a simple effective field theory to reasonably capture the features of the induced texture.