Abstract Submitted
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**Modeling geometric frustration with magnetic colloids**[1] GABI STEINBACH, SIBYLLE GEMMING, ARTUR ERBE, Helmholtz-Zentrum Dresden-Rossendorf, Institute of Ion Beam Physics and Materials Research, Dresden, Germany, DENNIS NISSEN, MANFRED ALBRECHT, Institute of Physics, Chemnitz University of Technology, Chemnitz, Germany — The implementation of artificial frustrated spin systems can give insight into the mechanisms which lead to the different equilibrium configurations in geometrically frustrated magnetic materials. Prominent artificial systems are the patterns of superconducting rings or nanometer-sized ferromagnetic islands. These are Ising systems allowing two possible in-plane orientations for each macroscopic moment. Here we present an alternative method using magnetically interacting colloids. The spherical shape of the particles allows the modeling of spin systems with continuous symmetry. Micrometer-sized silica particles are half capped with a Co/Pd multilayer thin film. Such thin films on curved surfaces have a predefined net magnetic moment called macrospin. The interaction of such particles in the self-arranged close-packed 2D structure is frustrated. Using video microscopy, the direction of the individual macrospins can be visualized by the spatial orientation of the magnetic caps. This setup allows us to investigate geometric frustration in static systems and in dynamic processes, e.g. during the particle-wise cluster growth. Further, we evaluate the impact of intrinsic defects and control defect formation extrinsically e.g. by varying the growth conditions.

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