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Stripes and their zigzagging in buckled hard spheres YAIR SHOKEF, University of Pennsylvania, YILONG HAN, Hong Kong University of Science and Technology, AHMED ALSAYED, PETER YUNKER, TOM LUBENSKY, ARJUN YODH, University of Pennsylvania — We use a hard sphere model to describe recent experiments on buckled colloidal monolayers. Our detailed Monte Carlo simulations exhibit the behavior, observed experimentally, of antiferromagnetic order and the formation of stripes that randomly zigzag around the system. Using free volume calculations, we deduce the strength of the effective antiferromagnetic interactions between neighboring particles. We furthermore explain how the geometrical frustration is partially removed by collective effects arising from sphere packing. We show how lattice distortions enable striped configurations to pack better than disordered ground states of the simple antiferromagnetic Ising model and that zigzagging of these stripes does not affect the free volume of the system.

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