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Bidispersed Sphere Packing on Spherical Surfaces[1] TIMOTHY ATHERTON, ANDREW MASCIOLI, CHRISTOPHER BURKE, Tufts University — Packing problems on spherical surfaces have a long history, originating in the classic Thompson problem of finding the ground state configuration of charges on a sphere. Such packings contain a minimal number of defects needed to accommodate the curvature; this is predictable using the Gauss-Bonnet theorem from knowledge of the topology of the surface and the local symmetry of the ordering. Famously, the packing of spherical particles on a sphere contains a 'scar' transition, where additional defects over those required by topology appear above a certain critical number of particles and self-organize into chains or scars. In this work, we study the packing of bidispersed packings on a sphere, and hence determine the interaction of bidispersity and curvature. The resultant configurations are nearly crystalline for low values of bidispersity and retain scar-like structures; these rapidly become disordered for intermediate values and approach a so-called Appollonian limit at the point where smaller particles can be entirely accommodated within the voids left by the larger particles. We connect our results with studies of bidispersed packings in the bulk and on flat surfaces from the literature on glassy systems and jamming.

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