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The role of symmetry for the orientational ordering of hard regular polygons WENBO SHEN, Department of Physics, University of Michigan - Ann Arbor, MICHAEL ENGEL, JOSHUA A. ANDERSON, Department of Chemical Engineering, University of Michigan - Ann Arbor, JAMES A. ANTONAGLIA, Department of Physics, University of Michigan - Ann Arbor, SHARON C. GLOTZER, Department of Chemical Engineering, University of Michigan - Ann Arbor, GLOTZER GROUP TEAM — Understanding the relationship between particle shape and structure is critical for targeted self-assembly. Hard particles, whose phase behavior is governed by geometry alone, spontaneously order when compressed to high enough packing density. Different routes of ordering have been suggested: a direct transition from fluid to crystal as well as the appearance of an intermediate liquid crystalline or a rotator phase. Here, we investigate a family of hard shapes in two dimensions that interpolate from highly anisotropy to highly circular. For this purpose, we determine the phase behavior of hard regular polygons from triangles to dodecagons at densities comprising the development of orientational order. In particular, we focus on the role of particle symmetry on rotational motion and the appearance of rotator phases.

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