

Abstract Submitted  
for the MAR16 Meeting of  
The American Physical Society

**Fluid to solid transition of hard regular polygons** JOSHUA ANDERSON, Univ of Michigan - Ann Arbor, MICHAEL ENGEL, JAMES ANTONAGLIA, ANDRES MILLAN, SHARON GLOTZER, University of Michigan — We perform simulations of hard regular polygons and determine the nature of the fluid to solid transition. Hard disks have a first order phase transition from fluid to hexatic and a continuous transition from hexatic to solid [1,2]. Hard polygons have shape and an additional degree of freedom. Directional entropic forces cause the polygons to attract edge to edge, which alters the phase transition. Polygons with enough edges have phase behavior similar to hard disks, with the density of the transition shifted lower. Polygons with few edges show a range of different behaviors. We develop and use HPMC [3] to run these simulations on the Titan supercomputer at the OLCF. HPMC is a scalable GPU-accelerated hard particle Monte Carlo simulation engine built on top of HOOMD-blue. [1] E. P. Bernard, W. Krauth, PRL 107, 155704 (2011). [2] M. Engel, J. A. Anderson, S. C. Glotzer, M. Isobe, E. P. Bernard, W. Krauth, PRE 87, 042134 (2013). [3] J. A. Anderson, M. E. Irrgang, S. C. Glotzer, arxiv:1509.04692

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Date submitted: 06 Nov 2015

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