

Abstract Submitted
for the HAW14 Meeting of
The American Physical Society

Large scale molecular dynamics simulations of nuclear pasta¹

C.J. HOROWITZ, Indiana University, D. BERRY, UITS, Indiana University, C. BRIGGS, M. CHAPMAN, Indiana University, E. CLARK, Indiana University and Bates College, A. SCHNEIDER, Indiana University — We report large-scale molecular dynamics simulations of nuclear pasta using from 50,000 to more than 3,000,000 nucleons. We use a simple phenomenological two-nucleon potential that reproduces nuclear saturation. We find a complex “nuclear waffle” phase in addition to more conventional rod, plate, and sphere phases. We also find long-lived topological defects involving screw like dislocations that may reduce the electrical conductivity and thermal conductivity of lasagna phases. From MD trajectories we calculate a variety of quantities including static structure factor, dynamical response function, shear modulus and breaking strain.

¹Supported in parts by DOE Grants No. DE-FG02-87ER40365 (Indiana University) and No. DE- SC0008808 (NUCLEI SciDAC Collaboration).

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Date submitted: 29 Jun 2014

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