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Large Scale Quantum Simulations of Nuclear Pasta[1] FARRUKH J. FATTOYEV, CHARLES J. HOROWITZ, Center for Exploration of Energy and Matter, Indiana University, BASTIAN SCHUETRUMPF, National Superconducting Cyclotron Laboratory, Michigan State University — Complex and exotic nuclear geometries collectively referred to as "nuclear pasta" are expected to naturally exist in the crust of neutron stars and in supernovae matter. Using a set of self-consistent microscopic nuclear energy density functionals we present the first results of large scale quantum simulations of pasta phases at baryon densities $0.03 < \rho < 0.10$ fm^{-3}, proton fractions $0.05 < Y_{\rm p} < 0.40$, and zero temperature. The full quantum simulations, in particular, allow us to also study the role and impact of the nuclear symmetry energy on these pasta configurations.

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