# Microstructure dynamics of matter under extreme conditions

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Matter at extreme conditions is related to many fields such as inertial confined fusion (ICF), astrophysical physics and materials science. The matter exhibits complicated responses under shock compression and laser interactions. The study the microstructures under exreme conditions, the time-resolved and space-resolved technique in both experiments and theories should be developed. We developed machine learning based interatomic potentials to extend the quantum-accuracy simulations up to millions of atoms, which can be used in the study of dynamic structures under extreme conditions. We demonstrate the microstructures of H, He, C and metals under extreme loading at high temperature and pressure.