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The effects of defects on melting under hydrostatic and shock loading QI AN, SHENG-NIAN LUO, TIMOTHY GERMANN, Los Alamos National Laboratory, LI-BO HAN, University of Science & Technology of China —
We perform molecular dynamics simulations on Cu to systematically investigate the effects of defects on melting under hydrostatic and shock loading. The defects investigated include vacancies and voids, stacking faults, dislocations, low and high energy grain boundaries, and free surfaces. Nucleation and growth of liquid during melting are characterized in terms of order parameters and diffusion coefficients to reveal the nature of defect-induced melting under contant pressure conditions. For shock-induced melting, we investigate the effect of preexisting defects including nanocrystalline Cu and single crystal Cu with voids.

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