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Dislocation Structure and Mobility in hcp ^{4}He MAURICE DE KONING, Universidade Estadual de Campinas, EDGAR JOSU LANDINEZ BORDA, Lawrence Livermore National Laboratory, WEI CAI, Stanford University — By means of Path Integral Monte Carlo Simulations, we assess the core structure and mobility of screw and edge basal-plane dislocations in hcp ^{4}He [1]. The results provide insight into the giant plasticity phenomenology, and show that the cores of both types of dislocation dissociate into non-superfluid Shockley partials separated by a stacking fault. Moreover, the displacement of the centroid positions of the partial cores exhibits considerable fluctuations even in absence of applied shear stresses. This is an indication of negligible lattice resistance to the dislocation motion, in accordance with the experimental observation of giant plasticity. Further results point out that aside from the dislocation structure, zero-point fluctuations play a role in this negligible lattice resistance. [1] Edgar Josu Landinez Borda, Wei Cai, and Maurice de Koning, Phys. Rev. Lett. 117, 045301 (2016).

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