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Defects and Impurities in Solid ^4He KEOLA WIERSCHEM, MARTECH, Dept. of Physics, Florida State University, EFSTRATIOS MANOUSAKIS, MARTECH, Dept. of Physics, Florida State University and University of Athens, Greece — We perform path integral Monte Carlo studies of defects and impurities in solid ^4He near the low temperature melting transition. The worm algorithm, recently developed for continuum systems, is used to study off-diagonal properties such as the one-body density matrix (OBDM). While this quantity approaches zero exponentially with increasing particle displacement for the “pure” solid, interstitial defects and ^3He impurities appear to enhance and/or stabilize the OBDM at long distances. Thus, imperfections in solid helium may lead to the formation of a condensate. These calculations are repeated for two-dimensional solid helium, and compared with results from lattice boson models.

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