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Local melting at surface and isotope impurities in quantum solids EMMANUELE CAPPELLUTI, Research Center SMC, INFM-CNR and Dept. Physics, University La Sapienza, Rome, Italy, GIANLUCA RASTELLI, Laboratoire de Physique et Modélisation des Milieux Condensés, CNRS, Grenoble, France, SERGIO GAUDIO, Dept. Physics, University La Sapienza, Rome, Italy, LUCIANO PIETRONERO, Research Center SMC, INFM-CNR and Dept. Physics, University La Sapienza, Rome, Italy — Surface melting is a well known phenomenon in classical solids, and it can be related to a *local* instability of the solid phase close to the surface truncation. In this contribution we employ a self-consistent harmonic approximation to investigate surface melting and local melting close to quantum impurities in quantum solids. We show that surface melting can occur at temperatures much lower than the critical temperature T_c of the solid phase instability in the bulk. Similar effects are driven by the presence of an isotope substitution. In this latter case, we show that stronger local lattice fluctuations, induced by a lighter isotope atom, can induce local melting of the host bulk phase. Experimental consequences and the possible relevance in solid helium are discussed.

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