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Superfluid interfaces in quantum solids EVGENI BUROVSKI, EVGENI KOZIK, Univ. of Massachusetts, Amherst, ANATOLY KUKLOV, The College of Staten Island, CUNY, NIKOLAY PROKOF'EV, BORIS SVISTUNOV, Univ. of Massachusetts, Amherst — One scenario for the non-classical moment of inertia of solid ^{4}He discovered by Kim and Chan [*Science*, **305**, 1941 (2004)] is the superfluidity of micro-crystallite interfaces. On the basis of the most simple model of a quantum crystal—the checkerboard lattice solid—we show that the superfluidity of interfaces between solid domains can exist in a wide range of parameters. At strong enough inter-particle interaction, a superfluid interface becomes an insulator via a quantum phase transition. Under the conditions of particle-hole symmetry, the transition is of the standard $U(1)$ universality class in $d = 3$, while in $d = 2$ the onset of superfluidity is accompanied by the interface roughening, driven by fractionally charged topological excitations.

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