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Superfluid networks with mesoscopic structure as models of supersolid 4He BURCU YUCESOY, JON MACHTA, NIKOLAI PROKOF'EV, BORIS SVISTUNOV, U. Massachusetts Amherst — One proposal for understanding supersolidity is that grain boundaries and/or defect lines in solid 4He may support superfluidity. To understand the consequences of this proposal, we carry out simulations of the XY model with mesoscale structure corresponding to grain boundaries and/or defect lines. In the absence of disorder, we find a sharp phase transition unlike the gradual transition seen in experiments on supersolids. However, with disorder we find results that are qualitatively similar to the experiments.

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