Dislocation-induced superfluidity in a model supersolid\(^1\)  KINJAL DASBISWAS, DEBAJIT GOSWAMI, CHI-DEUK YOO, ALAN DORSEY, University of Florida — The effect of an edge dislocation in inducing superfluidity is explored by coupling the elastic strain field of the dislocation to the superfluid density, and solving the corresponding Ginzburg-Landau theory. It is shown that superfluid density is induced along a single dislocation below a critical temperature determined by the ground state solution of a 2D Schrödinger equation with a dipolar potential. This superfluid behavior can be described by a 1D Ginzburg-Landau equation obtained through a weakly nonlinear analysis. We then extend our analysis to a network of dislocation lines considered before by Shevchenko and Toner, which could serve as a model for superflow through solid \(^4\)He. The effect of fluctuations and dynamics are included through a full time dependent Ginzburg-Landau theory.

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