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Effect of ^{3}He on the extinction of mass flux in solid helium[1] YE. VEKHOV, ROBERT HALLOCK, Univ. of Mass. Amherst — The flux, F, carried by solid ^{4}He , with nominal 300 ppb ^{3}He concentration, χ, in the range 25.6 - 26.3 bar rises with falling temperature and at a temperature T_d the flux decreases toward zero [1]. The behavior of the flux above T_d demonstrates the presence of a bosonic Luttinger liquid [2]. We study F as a function of ^{3}He concentration χ to explore the effect of ^{3}He on T_d. We find that the extinction of the flux is a sharp transition, typically complete within a few mK change in temperature. We find that T_d is an increasing function of χ and we compare (T_d, χ) with predictions for homogeneous phase separation. We conclude that phase separation plays an important role in the flux extinction. It is possible that the cores of edge dislocations carry the flux, and the flux is extinguished by the decoration by ^{3}He of the cores or dislocation intersections.

[1] M.Ray and R.B. Hallock, PRL 105, 145301 (2010); PRB 84, 144512 (2011).
[2] Ye. Vekhov and R.B. Hallock, PRL 109, 045303 (2012).

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