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Mass Superflux in Solid Helium: Dependence on Temperature, Density and ^{3}He Impurity Concentration YEGOR VEKHOV, ROBERT HALLOCK, Univ. of Mass. - Amherst — The mass flux, F, induced to flow through solid ^{4}He by means chemical potential differences imposed by the fountain effect in the range $25.6 < P < 26.4$ bar rises with falling temperature below 650 mK. At a low temperature, T_d, the flux drops sharply. The behavior of the flux above T_d is consistent with the presence of a bosonic Luttinger liquid. We report a study F as a function of ^{3}He concentration, χ $(0.17 - 220)$ ppm, and explore the effect of level of ^{3}He impurities on T_d. We find a strong reversible reduction of the flux, typically complete within a few mK. We find that T_d is an increasing function of χ and the $T_d(\chi)$ dependence differs somewhat from the predictions for bulk phase separation. It is possible that the cores of edge dislocations carry the flux. In such a case the flux may be extinguished by the decoration of the cores or dislocation intersections by ^{3}He. We find that F is sample-dependent, but that the temperature dependence of F above T_d is universal; data for all samples scale and collapse to a universal temperature dependence, independent of ^{3}He concentration but with a weak pressure dependence. [Work supported by NSF DMR 12-05217.]

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