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Superclimbing instability in solid Helium-4[1] ANATOLY KUKLOV, CSI and the Graduate Center, CUNY — The accumulation of matter in solid ^{4}He observed in the UMASS group and dubbed as the syringe effect is discussed within the model of dislocations with superfluid core beyond the linear approximation. Such dislocations are found to be unstable with respect to the syringe effect if biased by chemical potential above a threshold $\mu_c \approx Gb^4/L$, where G is the shear modulus, b - Burgers vector and L - free length of a dislocation. In almost perfect crystals, where L can be as long as several μm or even longer, the threshold is *macroscopically* small - corresponding to overpressures smaller than few mbar. This effect for edge dislocations has its high temperature analog - Bardeen-Herring instability of dislocations due to diffusive high temperature vacancy transport. For screw dislocations the instability develops through helix formation first observed in Si at high temperatures by W. C. Dash (1958). In solid ^{4}He the vacancy diffusion is replaced by the supertransport along dislocation cores. The instability should cause formation of the superfluid dislocation forest leading to the superflow-through-solid effect first observed in the UMASS group. Several testable predictions with respect to the bias and time dependence for the syringe dynamics are made.

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