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The A-B transition of superfluid ^{3}He under confinement[1] JEEVAK PARPIA, NIKOLAY ZHELEV, T.S. ABHILASH, ERIC SMITH, ROBERT BENNETT, Department of Physics, Clark Hall, Cornell University, Ithaca NY 14853, LEV LEVITIN, XAVIER ROJAS, JOHN SAUNDERS, Dept. of Physics, Royal Holloway University of London, Egham, TW20 0EX SURREY, UK — The influence of confinement on the phase diagram of superfluid ^{3}He is studied using the torsional pendulum method. We focus on the phase transition between the chiral A-phase and the time-reversal-invariant B-phase, motivated by the prediction of a spatially-modulated (stripe) phase at the A-B phase boundary. We confine superfluid ^{3}He to a single 1.08 μm thick nanofluidic cavity incorporated into a high-precision torsion pendulum, and map the phase diagram between 0.1 and 5.6 bar, the region of interest for the existence of the stripe phase. We observe only small supercooling of the A-phase, in comparison to bulk or when confined in aerogel. This has a non-monotonic pressure dependence, suggesting that a new intrinsic B-phase nucleation mechanism operates under confinement, mediated by the putative stripe phase. Both the phase diagram and the relative superfluid fraction of the A and B phases, show that strong coupling is present at all pressures, with implications for the stability of the stripe phase.

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