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A Novel Nano-Assembly Technique for the Creation of Ultra-Low Disorder, Locally-Tunable One-Dimensional Systems with Carbon Nanotubes JONAH WAISSMAN, MAAYAN HONIG, SHARON PECKER, AVISHAI BENYAMINI, ASSAF HAMO, SHAHAL ILANI, Weizmann Institute of Science — Carbon nanotubes offer exciting prospects for studies of fundamental physics in one dimension due to their propensity for clean, defect-free growth, and long lengths. Recent technological advances have allowed for the creation of zero-dimensional ultra-clean nanotube devices, leading to new physics. But to date, the full potential of these molecules for full-fledged experiments in extended one-dimensional geometries is still unrealized, owing to fundamental limitations in making complex and clean devices. In this talk, we will describe a new nano-assembly technique to create suspended carbon nanotube devices of large complexity and with extremely low levels of electronic disorder. We demonstrate the creation of devices with multiple electrostatic gates and devices that combine several nanotubes positioned at chosen distances from each other. These capabilities open the door to a wide array of new experiments on the physics of electrons, spins and mechanics in one dimension.

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