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Abstract:We describe a method to fabricate clean suspended single-wall carbon nanotube (SWCNT) transistors hosting a single quantum dot ranging in length from a few 10 s of nm down to ≈3 nm. We first align narrow gold bow-tie junctions on top of individual SWCNTs and suspend the devices. We then use a feedback-controlled electromigration to break the gold junctions and expose nm-sized sections of SWCNTs. We measure electron transport in these devices at low temperature and show that they form clean and tunable single-electron transistors. These ultra-short suspended transistors offer the prospect of studying THz oscillators with strong electron-vibron coupling.
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