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A Versatile Molecular Beam Epitaxy System for Low-Temperature STM: Instrument Design and Initial Results[1] ADAM BOWMAN, HAO DING, SANGJUN JEON, ALI YAZDANI, Princeton University — Efficient combination of molecular beam epitaxy (MBE) with scanning tunneling microscopy (STM) is essential for engineering and studying new materials with topological and superconducting properties. Particularly valuable are the capabilities to grow clean material interfaces, single monolayer films, and 2D systems with proximitized superconductivity. A new MBE system designed for STM was constructed to allow reliable ultra-high vacuum sample transfer, growth between 77 K and 1500 K, direct current sample flashing, and RHEED surface monitoring. Six Knudsen cells and electron beam evaporators allow growth of a variety of superconducting, topological, and metallic films. UHV transfer from the MBE via a vacuum suitcase can be accomplished within an hour to preserve clean surfaces. Initial low-temperature STM results on bismuth and monolayer iron selenide (FeSe) films will be presented.

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