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**Integrated MEMS mass sensor and atom source for a "Fab on a Chip"** HAN HAN, MATTHIAS IMBODEN, THOMAS STARK, DAVID BISHOP, Boston University — "Fab on a Chip" is a new concept suggesting that the semiconductor fabrication facility can be integrated into a single silicon chip for nanomanufacturing. Such a chip contains various MEMS devices which can work together, operating in a similar way as a conventional fab does, to fabricate nanostructures. Here we present two crucial "Fab on a chip" components: the MEMS mass sensor and atomic evaporation source. The mass sensor is essentially a parallel plate capacitor with one suspended plate. When incident atoms deposit on the suspended plate, the mass change of the plate can be measured by detecting the resonant frequency shift. Using the mass sensor, a mass resolution of 3 fg is achieved. The MEMS evaporation source consists of a polysilicon plate suspended by two electrical leads with constrictions. By resistively heating the plate, this device works as a tunable atom flux source. By arranging many of these devices into an array, one can build a multi-element atom evaporator. The mass sensor and atom source are integrated so that the mass sensor is used to monitor and characterize the atomic flux. A material source and a sensor to monitor the fabrication are two integral components for our "Fab on a Chip."

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