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Molecular beam characterization using a laser-cooled atomic gas target[1] THOMAS PRESCOTT, GENE POLOVY, MARIO MICHAN, The University of British Columbia, FRANK STIENKEMEIER, Universität Freiburg, ECKART WREDE, Durham University, KIRK MADISON, TAKAMASA MOMOSE, The University of British Columbia — Molecular beams are important experimental tools for the study of intermolecular potentials by way of collisions (both high energy and ultra-cold). In addition, molecular beams are critically important for certain semiconductor processing and fabrication applications (e.g. MBE). However, despite their wide-spread use and importance to both fundamental research and commercial applications, the absolute flux and beam profile of molecular beams is very difficult to determine due to the lack of suitable tools. The usual choice for this task is the ion gauge which suffers from a series of limitations including sensor degradation, calibration drift, and limited spatial resolution due to a large sensor area with a sensitivity that varies in an unpredictable and uncontrollable way due to dynamic variations in the electron plasma density. We present here the demonstration of an alternative, robust, and calibration free detection method that relies on a laser cooled atomic sample as the sensor element. We use it to characterize the absolute flux and beam profile of a molecular beam apparatus for noble gas beams.

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