Abstract Submitted
for the TSF12 Meeting of
The American Physical Society

Pulsed rotating supersonic source for merged molecular beams LES SHEFFIELD, MARK HICKEY, VITALIY KRASOVITSKIY, DAYA RATHNAYAKA, IGOR LYUKSYUTOV, DUDLEY HERSCHBACH, Texas A&M University — We continue the characterization of a pulsed rotating supersonic beam source. The original device was described by M. Gupta and D. Herschbach, J. Phys. Chem. A **105**, 1626 (2001). The beam emerges from a nozzle near the tip of a hollow rotor which can be spun at high-speed to shift the molecular velocity distribution downward or upward over a wide range. Here we consider mostly the slowing mode. Introducing a pulsed gas inlet system, and a shutter gate eliminate the main handicap of the original device in which continuous gas flow imposed high background pressure. The new version provides intense pulses, of duration 0.1–0.6 ms (depending on rotor speed) and containing $\sim 10^{12}$ molecules at lab speeds as low as 35 m/s and $\sim 10^{15}$ molecules at 400 m/s. Beams of any molecule available as a gas can be slowed (or speeded); e.g., we have produced slow and fast beams of rare gases, O2, NO2, NH3, and SF6. For collision experiments, the ability to scan the beam speed by merely adjusting the rotor is especially advantageous when using two merged beams. By closely matching the beam speeds, very low *relative* collision energies can be attained without making either beam very slow.

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Date submitted: 18 Sep 2012 Electronic form version 1.4