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Supersonic expansions of molecular oxygen[1] JESUS PEREZ-RIOS, MARTA ISABEL HERNANDEZ, Instituto de Fisica Fundamental, CSIC, Serrano 123 28006, Madrid, Spain, GUZMAN TEJEDA, SALVADOR MONTERO, Instituto de Estructura de la Materia, CSIC, Serrano 121 28006, Madrid, DPTO. DE FISICA ATOMICA, MOLECULAR Y DE AGREGADOS TEAM, LAB. DE FLUIDODINAMICA MOLECULAR TEAM — Supersonic jets are gas dynamic quasi-universal structures showing a wealth of features combining laminar and turbulent flow, relaxation effects, shock waves, vortices, slip effects, and condensation, spanning a wide range of densities, temperatures, chemical species, and Kn numbers.In the supersonic expansion exists a zone between the nozzle and the shock wave, called the zone of silence. We apply the Raman spectroscopy in this zone to obtain the experimental number density and the population of therotational levels. This method has a high special resolution ($<5\mu$m) and high-sensitivity spectroscopy (<photon/sec). These measures allow us to compare the theory with the experiment using the master equation (derived from the Boltzmann equation).In this work we apply this experimental technique to a molecular oxygen expansion, showing a good agreement between theory (where we have used the PES obtained by M. Bartolomei; et al.) and the experiment.

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