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Determination of Argon metastable density from relative emission intensity measurements combined with optical emission cross section data JARED MILES, STEVEN ADAMS, ADAM LABER, Propulsion Directorate, Air Force Research Laboratory, Wright-Patterson AFB, OH, BOYD TOLSON, Innovative Scientific Solutions Inc., Dayton, OH — The plasma diagnostic technique of optical emission spectroscopy can yield a variety of information depending on the resolution of measurement and the extent of supporting data that exists on the fundamental optical properties of the species of interest. Advanced plasma diagnostics can be achieved when optical emission measurements are combined with available electron-impact cross sections, yielding many useful plasma parameters such as electron density, electron temperature, and gas temperature as well as absolute species concentration. In recent years, a considerable amount of data has been compiled for electron excitation of Argon, for which cross-sections have been measured for electron excitation from both the ground state and metastable states. In this work, it was investigated how the different patterns of excitation rates from the Ar ground and metastable states could, under various conditions, yield information on absolute Ar metastable concentrations from simple measurements of relative intensities of spectral lines in the violet range.

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