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Time Evolution of Electron Density in Atmospheric Discharges¹ WILLIAM C. YOUNG, University of Wisconsin - Madison, C.A. ROMERO-TALAMÁS, University of Maryland - College Park — The electron density of atmospheric air discharges was found via the Stark broadening of H-beta emissions, with the time evolution of spectra captured by several methods to be compared: a spectrometer with a streak camera, a spectrometer with a gated ICCD camera, and photodiodes with filters. Discharges on the order of 10 microseconds in duration, a joule in energy and a few millimeters in length, were created across a triggered spark gap. A second spark gap allowed shunting away of current to yield a roughly rectangular current pulse through the discharge, permitting the examination of plasma afterglow. Additionally, evolution of discharges exposed to low level ionization radiation and an ion generator are examined to determine how background ion level impacts the observable discharge dynamics, with potential applications in remote detection of radiation.

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