

Abstract Submitted
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Temperature estimation from molecular nitrogen UV spectra in atmospheric pressure plasmas¹ KEENAN PEPPER, Florida State University, YONGHO KIM, Los Alamos National Laboratory, JIHUN KIM, Seoul National University — Atmospheric pressure plasmas have many potential applications to fuel processing, surface treatment, and manipulation of chemical reactions. These plasmas are often non-thermal, which means different species are not in equilibrium and have different effective temperatures. This is critical for many applications because it allows high concentrations of reactive species to be produced without using a prohibitive amount of power. In the present work, numerical software was developed to estimate the vibrational and rotational temperatures (T_{vib} and T_{rot}) of N_2 molecules from their ultraviolet emission spectra. The electron temperature T_e can also be estimated by comparing the N_2 spectrum to that of the N_2^+ molecular ion. This technique is applied to several plasma sources including audio frequency, RF, and microwave devices. The results are presented and their implications for practical applications are discussed.

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