Population Distribution of Atmospheric Pressure Argon Discharge Based on CR Model HIROSHI AKATSUKA, Tokyo Tech. — We carried out numerical study on the population densities of excited states of argon atoms under atmospheric pressure discharge for the basis of OES measurement of electron temperature and density. As a numerical code, we applied collisional radiative model (CR model) to calculate excited populations as a function of the electron temperature, density, gas temperature and total pressure. As a preliminary stage, we assumed the EEDF to be Maxwellian in the present study. The CR model included not only electron collisional/radiative processes but also atomic collisional processes and optical escape factors. We found that the highly excited states for the recombining plasma are not in the state of LTE, which were generally considered to be the case for the low-pressure discharge. Excitation temperature became closer to the gas temperature when we applied the levels with the same principal quantum number. On the other hand, it became closer to the electron temperature when the levels with the same angular momentum states were used. Consequently, there is possibility to obtain electron temperature by line intensity measurement.

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