Abstract Submitted
for the GEC18 Meeting of
The American Physical Society

Diagnostics of atmospheric-pressure N_2/O_2 plasma jet with green optical emission K. SASAKI, S. NISHIYAMA, M. SHIMABAYASHI, K. UENO, N. SHIRAI, Hokkaido Univ — We recently developed an atmospheric-pressure nitrogen plasma jet, in which we observed green optical emission when adding a small amount of oxygen. It was identified that the blue color of the plasma originated from the $^1D - ^1S$ forbidden transition of atomic oxygen at a wavelength of 557.73 nm. This forbidden transition is well known as the source of the green color of an aurora, but we believe that the observation of the forbidden optical emission from a small atmospheric-pressure plasma source is surprising and interesting. In the work, we examined the densities of various species in the plasma jet by optical emission spectroscopy and laser-induced fluorescence spectroscopy. The optical emission spectrum indicated a line emission at 557.73 nm with a broadband tail component. The broadband tail component suggests that the transition probability of the forbidden line is enhanced by the formation of the ON_2^* excimer. We measured the densities of atomic oxygen and nitrogen by two-photon laser-induced fluorescence. In addition, we currently try to detect $N_2(A^3\Sigma_u^+)$ by laser-induced fluorescence or cavity-ringdown absorption spectroscopy.

Koichi Sasaki
Hokkaido Univ

Date submitted: 21 Jun 2018 Electronic form version 1.4