Abstract Submitted
for the GEC14 Meeting of
The American Physical Society

Electron density and temperature diagnostics for atmospheric pressure plasmas using continuum radiation SANGHOO PARK, Korea Advanced Institute of Science and Technology, SE YOUN MOON, Chonbuk National University, WONHO CHOE, Korea Advanced Institute of Science and Technology — Information on electrons is particularly valuable because most of the important plasma reactions are governed by electron kinetics. However, diagnostics of electron density (n_e) and temperature (T_e) of low temperature atmospheric pressure plasmas is still challenging although there are some advanced diagnostics available such as laser Thomson scattering or optical emission spectroscopy combined with complex plasma equilibrium models. In this work, we report a simple spectroscopic diagnostic method with high temporal and spatial resolution based on continuum radiation in the UV and visible range for n_e and T_e. Together with the basic principle for the diagnostics including electron-atom bremsstrahlung (or neutral bremsstrahlung) and hydrogen radiative dissociation continuum, some experimental results in several argon and helium atmospheric pressure plasmas will be presented. In a typical argon 13.56 MHz parallel plate capacitive discharge, the measured values are $T_e = 2.5$ eV and $n_e = 0.7\text{-}1.1 \times 10^{12}$ cm^{-3} at $P_{rf} = 110\text{-}200$ W. Two-dimensional T_e profile of an Ar pulsed plasma jet using a DSLR camera and this diagnostics will also be shown.

Sanghoo Park
Korea Advanced Intitute of Science and Technology

Date submitted: 28 Aug 2014 Electronic form version 1.4