

## The thermal history of comets derived from the EUV spectra data observed by HISAKI

\*Kanae Nomura<sup>1</sup>, Kazuo Yoshioka<sup>1</sup>, Kei Masunaga<sup>2</sup>

1. University of Tokyo, 2. University of Colorado Boulder

From 2015 to 2018, five comets (C/2013 X1 Panstarrs, C/2013 US10 Catalina, 46P/Wirtanen, 21P/Giacobini-Zinner, and 67P/Churyumov-Gerasimenko) had been observed by HISAKI that is the spectroscopic observatory of planets from the low earth orbit. By comparing with the background data, the spectra of two comets (Panstarrs and Catalina) could be revealed. We derived the extreme ultraviolet (EUV) lights spectra of various species of atomic and molecular in these comets by subtracting geocorona around the Earth from the observed data. It is thought that comets keep the information about the temperature environment and materials in the protoplanetary disk. Therefore, to study the chemical composition of the comets' comae and nuclei helps us to obtain information about the protoplanetary disk. Particularly, H<sub>2</sub>O, CO<sub>2</sub> and CO, which are the main ingredients of comets, are the most important clues to know the evolution of comets. The difference in the sublimation temperature of H<sub>2</sub>O, CO<sub>2</sub> and CO reflects the temperature environment at the formation stage of the protoplanetary disk. On the other hand, the ratio of CO<sub>2</sub>/CO reflects the oxidation environment (Ootsubo et al., 2012). In this presentation, we will introduce the EUV spectra of comets obtained by HISAKI and physical processes about the emission of several atomic species (H, C, O). We will also show the ratio of H<sub>2</sub>O, CO<sub>2</sub>, CO that was derived from the emission of atomic species and discuss the scientific scenarios by comparing with the values of the other comets that have been observed in the past.

Keywords: Comets, HISAKI, Extreme Ultraviolet (EUV), Chemical composition