

Test results of the breadboard-model ion mass spectrometer for the Comet Interceptor mission

*Satoshi Kasahara¹, Mizuho WATANABE¹, Oya Kawashima¹, Shoichiro Yokota², Yoshifumi Saito³, Kazushi Asamura³, Masafumi Hirahara⁴

1. The University of Tokyo, 2. Osaka University, 3. Institute of Space and Astronautical Science, 4. Nagoya University

Comets are pristine small bodies and thus provide key information about the solar system evolution. Remote observations by ground observatories have characterized various comets, while in-situ observations by spacecraft have brought much more detailed information on several comets. However, the direct observations by spacecraft fly-by or rendezvous have been limited to the short-period comets, which neared the sun many times in the past and thus lost some of primitive characteristics. The Comet Interceptor mission, led by ESA, aims at a long period comet or an interstellar object. JAXA will provide an ultra-small (24 U) daughter spacecraft (probe B1), whose closest approach will be less than 1,000 km, allowing the first-ever multi-spacecraft fly-by observations of a comet. Probe B1 will be equipped with three scientific instruments: (1) the Plasma Suite, which is comprised of an ion mass spectrometer and a three-axis magnetometer, (2) the Hydrogen Imager, and (3) the Narrow/wide Angle Cameras. Here we report our test results of the breadboard-model ion mass spectrometer. The mass resolution obtained in the laboratory experiment is $M/dM > 30$, which agrees with the numerical simulation. It enables the discrimination among carbon, nitrogen, and oxygen ions, which are major elements in cometary comae.