Current Status and Scientific Targets of Superconductive Submillimeter-Wave Limb-Emission Sounder (SMILES)

Masato Shiotani[1]; Masahiro Takayanagi[2]

[1] RISH; [2] JAXA

http://smiles.tksc.jaxa.jp/indexj.shtml

1. Introduction

Superconductive Submillimeter-Wave Limb-Emission Sounder (SMILES) was designed to be aboard the Japanese Experiment Module (JEM) on the International Space Station (ISS) as a collaboration project of Japan Aerospace Exploration Agency (JAXA) and National Institute of Information and Communications Technology (NICT). Mission Objectives are: i) Space demonstration of superconductive mixer and 4-K mechanical cooler for the submillimeter limb-emission sounding, and ii) global observations of atmospheric minor constituents in the stratosphere (O3, HCI, CIO, HO2, HOCI, BrO, O3 isotopes, HNO3, CH3CN, etc) , contributing to the atmospheric sciences.

2. Targets of SMILES

The SMILES observation is characterized as aiming at variation and its impact of radical species in the stratosphere. Based on its high sensitivity in detecting atmospheric limb emission of the submillimeter wave range, JEM/SMILES will make measurements on several radical species crucial to the ozone chemistry (normal O3, isotope O3, ClO, HCl, HOCl, BrO, HO2, H2O2). Some of them have never be seen by any other satellite measurements, and the JEM/SMILES mission will be the first to detect them such as BrO. The SMILES also try to observe isotopic composition of ozone. Unusually high enrichment in most of the heavy ozone isotopomers in the stratosphere has been puzzling problem, and the JEM/SMILES observation will provide us important findings to work out the puzzle.

3. Current status

As a result of some policy changes a new SMILES science team has been recently established and authorized in JAXA. The SMILES science team has been made up of scientists inside and outside JAXA including overseas scientists. As a consequence of the science team activity we try to form a research core of the earth and planetary atmospheric science in JAXA through coordination with, for example, PLANET-C (Probe of Venus Atmosphere) project. The system detail design and manufacturing of the proto-flight model (PFM) for JEM/SMILES is now being developed, and it is aiming at the launch scheduled in 2009 by the H-II Transfer Vehicle (HTV).