



Overview and Early Results of the Superconducting Submillimeter-Wave Limb-Emission Sounder (SMILES)

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The Superconducting Submillimeter-Wave Limb-Emission Sounder (SMILES) was developed to be aboard the Japanese Experiment Module (JEM) on the International Space Station (ISS) under the cooperation of the Japan Aerospace Exploration Agency (JAXA) and the National Institute of Information and Communication Technology (NICT). SMILES was successfully launched by the H-IIB rocket with the H-II Transfer Vehicle (HTV) on September 11, 2009 and was attached to JEM on September 25. Mission objectives are: i) Space demonstration of 4-K mechanical cooler and super-conductive mixer for the submillimeter limb-emission sounding in the frequency bands of 624.32– 627.32 GHz and 649.12– 650.32 GHz, and ii) global observations of atmospheric minor constituents in the middle atmosphere (O₃, HCl, ClO, HO₂, HOCl, BrO, O₃ isotopes, HNO₃, CH₃CN, etc), contributing to the atmospheric sciences. SMILES started atmospheric observations on October 12, 2009, and has been making very precise measurements on several radical species crucial to the ozone chemistry with its high-sensitivity. In this presentation, the overview of SMILES and the early results will be shown to demonstrate its high potential to observe the atmospheric minor constituents in the middle atmosphere.