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PPS03-04 会場:105 時間:5 月 24 日 11:30-11:45

火星及び惑星の赤外線高分散分光観測の試み：東北大の現況
Trial of infrared high-spectral resolution spectrocopy for Mars and Planets: Current studies in Tohoku Univ.

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Mid-high spectral resolution spectroscopy revails us minor components and dynamics of planetary systems. We Tohoku University group has tried to apply this technique mainly by three methods.

The first is the space observations from orbiters (see Aoki et al., in this meeting). We have investigated the Mars Express (MEX) Planetary Fourier Spectroscopy (PFS) data for several years under the collaboration with Italian groups. In 2004, MEX/PFS team found CH4 in the Martian atmosphere (Formisano et al., 2004). Associated with its spatial anisotropy and time variations, the loss mechanism by oxidant component becomes important. We analyzed the data and concluded that the oxidant in the atmosphere is insufficient for the support of CH4 time and spatial variations suggested by several observations. As the next target, we just started to investigate the vertical profile of CH4 by same instruments.

The second is the ground-based observations (see Aoki et al., in this meeting). We have investigated the SO and SO2 abundances in the Martian atmosphere by submm observations. In all results, we could not find any signature of gas produced from the crust, which would suggest that the origin of CH4 is not volcanic-like crust activities. In Nov 2011, Jan 2012, and Apr 2012, we also used SUBARU IRCS for the simultaneous observation of Martian CH4 lines. This observation aims the areas where the enhancement of CH4 was reported in past observations from ground (low-latitude region) and from MEX/PFS (polar region) in different Martian season. The preliminary result will be shown in the meeting.

The last is the instrument development (see Nakagawa et al., in this meeting). We have developed a ultra-high spectral resolution spectrometer, called MILAHI (Mid-Infrared LAser Heterodyne Instrument), for 7-11 um wavelength at a resolution of up to 10^{7-8} and a bandwidth of 1GHz. In Sep 2011 and Jan 2012, the test equipment was mounted on the Higashi-Hiroshima 1.5m telescope to perform test observations with Moon, Venus, and stars. Unfortunately, the final success was prevented by bad weathers, but the observed S/N told us that we should get the Venus and Mars spectrum with this design. We just finish the development phase of this project.

Although a telescope dedicated to this instrument does not exist yet, we expect to attach it to the PLANETS telescope at the top of Mt. Haleakala, Maui island, Hawaii, which is now in development with Univ. Hawaii, Tohoku Univ., Kippenhauer Inst., National Univ. of Mexico, Univ. Turku, Harlingten Inovative Optics Co., Stan Truitt Breckenridge Astronomycal Ltd, and collaborators (see Okano et al., in this meeting). Its first light is, if all things are going well, in 2014.

キーワード: Mars, infrared, spectroscopy, CH4, velocity field, new telescope
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