

## 土星の衛星からの水メーザー輝線検出の試みII

### A Search for Water Masers in the Saturnian System II

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The maser emissions are widely found in celestial objects such as dense cores of molecular clouds and circumstellar envelopes of late-type stars. These masers have been used as probes of gases with the H<sub>2</sub> number density of typically 10<sup>4</sup>-10<sup>10</sup> cm<sup>-3</sup>.

For solar system objects, several maser and laser phenomena (CO<sub>2</sub>, OH, H<sub>2</sub>O etc.) have been found, and each phenomenon would be induced by different physical processes.

As for H<sub>2</sub>O maser, the first detection was reported at the catastrophic impact of comet Shoemaker-Levy9 and Jupiter (Cosmovici et al. 1996). Recently, Pogrebenko et al. (2009) have reported the detections of H<sub>2</sub>O masers from the Saturnian satellites (Titan, Hyperion, Enceladus and Atlas) with the Medicina 32m and Metsahovi 14m telescopes.

We have searched for the H<sub>2</sub>O maser emission at 22.235 GHz from several Saturnian satellites with the Nobeyama 45m radio telescope in May 2009. Observations were made for Titan, Hyperion, Enceladus and Atlas, for which Pogrebenko et al. (2009) had reported detections, and in addition for Iapetus, and other inner satellites. However, we could not detect any signals of the water maser for all the satellites. Sensitivities of our observations were comparable or even better than those of Pogrebenko et al. (2009).

We infer that the water maser emission from the Saturnian system is extremely weak, or sporadic in nature. Monitoring over a long period and obtaining statistical results must be made for the further understanding of the water maser emission in the Saturnian system.

We have already reported the results of Titan, Hyperion, Iapetus, Enceladus and Atlas at the Annual Meeting of the Astronomical Society of Japan (Autumn 2009). In this meeting, we will report the new results of inner Saturnian satellites, and we summarize the water maser observations in 2009.

Cosmovici et al. 1996 Planet. Space. Sci., 44, 735

Pogrebenko et al. 2009, A&A, 494, L1

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