

NIIHAMA Project: Continuous monitoring of Jupiter's infrared auroras

Takehiko Satoh^{1*}, Masaki Fujimoto¹, Masato Kagitani², Shoichi Okano³, Pierre Martin³, Jeff Kuhn³

¹Japan Aerospace Exploration Agency, ²Tohoku University, ³University of Hawaii

The physics in the voluminous magnetosphere of Jupiter is made complicated by the strong magnetic field with fast rotation (~10 hours), and by significant amount of plasma that originates from a volcanic satellite, Io. Jupiter's auroras were known since 1970's but the mechanism of its production and maintenance still poorly understood to date. NIIHAMA project is thus motivated to perform long-term continuous monitoring of Jupiter's infrared auroras with a specifically-designed infrared camera attached to UHH's Hoku Kea Telescope.

NIIHAMA is an acronym of "Near-Infrared Imager on the Hoku keA telescope for Monitoring of Auroras". The camera was developed based on the technology that was used for the 2-um IR camera on board Japan's Venus Climate Orbiter, Akatsuki. The detector is a 1024x1024 PtSi array manufactured by Mitsubishi Electric, Co., Japan. Four filters (J, H, K, and 3.4-um for Jovian aurora) are installed in a 6-position filter wheel. The entire system has been developed by Sumitomo Heavy Industries, Ltd., Japan
(located in Niihama, Ehime).

As the Sun rotates with about a month of rotation period, the sector structure of the solar-wind plasma at vicinity of the Sun periodically changes. Our strategy with NIIHAMA is to monitor the auroras continuously for a month or a bit longer to effectively separate the intrinsic activity of Jupiter's magnetosphere from the solar-wind influence at Jupiter's orbit. This kind of study will be done within Jupiter's magnetosphere when the USA's JUNO spacecraft arrives at Jupiter in 2016. The ground-based study with NIIHAMA will provide, from Hilo, Hawaii, useful and valuable precursor information before "in-situ" measurements are done with far more expensive spacecraft mission. Coordinated observation with the soon-to-be-launched SPRINT-A/EXCEED should also be very valuable.