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## Optical lightning detection for investigation of atmospheric dynamics in Jupiter

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Recent observational and theoretical studies suggest that thunderstorms, namely, strong moist convective clouds in Jovian atmosphere are very important not only as an essential ingredient of meteorology of Jupiter but also as a potentially very useful probe of the water abundance of the deep atmosphere, which is crucial to constrain the behavior of volatiles in early solar system. Here we propose an optical lightning detector on board Jovian orbiter, composed of 2 CMOS cameras with different bandwidth filters and FPGA self-triggering electric circuit, which detects lightning flashes and provides information in order to estimate the depth of lightning discharge. For same purpose we also plan to install a high-speed CCD imager at a 1.6-m telescope at Hokkaido University observatory located in Noyoro city, Hokkaido, Japan. Quantitative comparison between the lightning activity and the cloud motion will contribute to the understanding of mechanisms of the atmospheric dynamics in Jupiter.

Keywords: Jupiter, lightning, thundercloud, spacecraft, ground-based telescope