

## Scientific Objectives of Hayabusa-2 LIDAR experiment

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We introduce scientific objectives of LIDAR experiment of Hayabusa-2 mission. Members of the LIDAR science team increased October, 2011, to promote geodetic studies of asteroid and to help development of LIDAR instrument in the prospect of scientific use of the ranging data. Then we redefined the scientific objectives of LIDAR experiment as follows:

(1) To identify collisional family of 1999JU3 from albedo map taken by LIDAR in addition to in situ spectral measurements of AMICA and NIRS3

(2) To elucidate the nature and history of accretion and destruction of rubble pile body on the basis of average porosity

(3) To constrain orbital evolution of 1999JU3 from irradiation age of cosmic rays and implantation of solar wind elements.

Further, we discussed what kind of observations Hayabusa should have conducted at Itokawa to maximize achievements of chemical analyses of returned samples, and concluded that following two points should be considered for Hayabusa-2.

(4) To prove or disprove universal existence of rubble pile bodies from a comparison of Itokawa and 1999JU3 and spatial variation of porosity

(5) To explore dust environment around asteroid by detecting levitating dust and dust ejected from artificial impact

In this talk, the above objectives are explained in detail with expected spec of LIDAR instrument and possible scenario of the proposed observation.

Keywords: asteroid, planetary exploration, hayabusa