

On the Detection of an Ejecta Dust Cloud Around Asteroid (3200) Phaethon by the DESTINY⁺ Dust Analyzer

*Hiroshi Kimura¹, Masanori Kobayashi¹, Koji Wada¹, Tomoko Arai¹, Hiroki Senshu¹, Masateru Ishiguro², Hidekazu Hanayama³, Ko Ishibashi¹, Takayuki Hirai¹, Fumi Yoshida¹, Peng Hong¹

1. Planetary Exploration Research Center, 2. Seoul National University, 3. Ishigakijima Astronomical Observatory

We will provide the most recent report on the detectability of an ejecta cloud around Asteroid (3200) Phaethon by the DESTINY⁺ Dust Analyzer (DDA), based on a model of dust dynamics in the cloud. We demonstrate that solar radiation pressure plays a vital role in shaping the spatial distribution of dust particles in Phaethon's ejecta cloud, because small particles, albeit the majority, are expelled from the sunward direction. We find that the DDA will have an opportunity of detecting dust particles in the ejecta cloud of Phaethon during a flyby, depending on the closest approach to the asteroid, heliocentric distance, and the initial velocity of ejecta. There are no hazard from impacts of 100 μm -sized ejecta particles that potentially could make tiny holes on the surface of the spacecraft during a flyby.

Keywords: Asteroid (3200) Phaethon, ejecta dust cloud, DESTINY+