

[7SS-05] High resolution imagings of the Gegenschein with WIZARD

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The Gegenschein is a faint glow around the anti-solar point caused by the interplanetary dust particle(IDP)'s back-scattering enhancement. From the previous low resolution observations, the overall morphology of the Gegenschein has been intensively studied. However, sub-degree scale fine structure of the Gegenschein is still not well known, even though the detailed morphology of the Gegenschein within a few degree from the anti-solar point may supply pivotal information about the property of the IDPs.

We made optical CCD observations of the Gegenschein between 2003 March and 2006 November. From the observations, we succeeded in making high resolution images of the Gegenschein, with unprecedented 1.4 resolution. Our results concur with IDP cloud model based on the infrared observations combined with scattering phase function derived from low resolution data. The only exception is the anti-solar point. We found a steep additional brightness enhancement existing at the exact anti-solar point. Plausible explanation of the finding is that the IDPs are significantly larger than observing wavelength, and have irregular morphology or inhomogeneous internal structure. Furthermore, we measured average geometric albedo of the IDPs from the optical brightness of the anti-solar point. The geometric albedo was 0.06 ± 0.01 , similar to those of comets or C-type asteroids.

[7SS-06] 17P/Holmes: Contrast between before and after the 2007 outburst

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A Jupiter-family comet, 17P/Holmes, underwent an outburst on 2007 October 23. Since there has been no more dramatic comet outburst than the 17P/Holmes event in the history of modern astronomical observations, active observations were made soon after the outburst. However, little is known about the activity before the outburst because of the accidental event. In addition, since the nucleus has been veiled by the thick dust cloud by the 2007 outburst, the physical status of the nucleus was unknown. In this presentation, we investigated the contrast between before and after the outburst through the imaging observations in both optical and mid-infrared wavelengths. We thus analyzed data taken by Akari infrared telescope, Subaru 8-m telescope, University of Hawaii 2.2-m telescope and Nishi-Harima Astronomical Observatory 2-m Nayuta telescope. As the result, we found that the nucleus was significantly activated through the outburst. The surface fractional active area was 0.3% in the pre-outburst data while 10% in the post-outburst data. We expect that 17P/Holmes shows strenuous activity in the next return in 2013-2014.