

## SUBARU/COMICS MID-INFRARED OBSERVATION OF NEAR-NUCLEUS REGION OF COMET 17P/HOLMES AT THE EARLY PHASE OF THE OUTBURST.

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**Introduction:** Comet 17P/Holmes was one of the short-period comets, which was discovered by E. Holmes (London, England) in November 6, 1892. The comet was discovered during an apparent outburst in brightness, and was visible to the naked eye through the first half of November 1892[1].

The similar large outburst in brightness occurred in the late of October 2007. The comet became a naked eye object on October 24, although the normal brightness of magnitude 16 on October 23. In Japan many amateur astronomers observed it as 2--3 total magnitude on late of October 24 UT. The appearance in the first phase was an almost stellar with no tail even in the binocular or telescope. Such huge outburst was extraordinary. We asked the director to keep time of the Subaru telescope for observing this phenomenon. The spectrum taken at the first phase of the outburst was strong continuum emission, which suggests that the dust was the dominant composition contributing to the brightness[2]. Fortunately, the Cooled Mid-Infrared Camera and Spectrometer (COMICS) was attached to the Subaru telescope at that time, which was suitable to see the dust particles in the comet.

**Observation:** A mid-infrared 8-13micron imaging and spectroscopic observations of Comet 17P/Holmes in the early phase of the outburst in brightness was performed on 2007 October 25--28 using the COMICS on the 8.2-m Subaru Telescope.

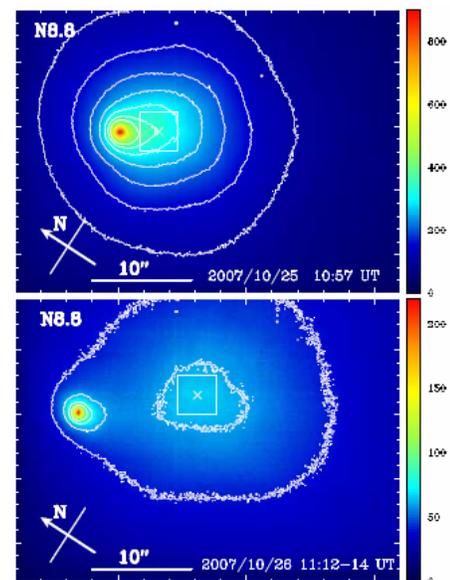
We detected a dust cloud which was moving away from the nucleus toward the direction of the solar radiation pressure, as shown in the figure. We performed the imaging and spectroscopic observations mainly of this dust cloud together with the nucleus itself.

**Results:** The motion of the dust cloud seems to be constant velocity as 130m/sec (projected) which is similar value derived by Montalto et al[3]. The beginning time of the cloud separation should be around October 24.1 UT. If we assume the acceleration, it will be earlier as 24.5UT at most. The outburst itself had been recognized at least at around 24.0 UT, which suggests that this dust cloud ejection occurred at different epoch from the main outburst ejection.

On the other hand, 11.2 micron peak of the crystalline silicate feature onto the broad amorphous silicate feature was detected both in the central condensation of the nucleus and the dust cloud. The origin and the nature of the dust in this cloud are discussed.

Comparing with the outburst 115 years ago is included while considering these various observation results overall, we introduce the result of considering what happened in Comet 17P/Holmes.

Figure: N8.8 images of 17P/Holmes on October 25(above) and 26(below), 2007. The flux unit is Jy/pixel. The pixel scale is 0.13". The cross indicates the cloud center we determined.



### References:

- [1] Kronk (2003), *Cometography* 2, 694.
- [2] Kobayashi et al.(2007), *IAU Circ. No.8887*.
- [3] Montalto et al.(2008), *A&A* 479, L45.