

Two Years After: Cometary Activity of Centaur (60558) 174P/Echeclus. Young-Jun Choi¹ and Paul Weissman², ¹Korea Astronomy and Space Science Institute (61-1 Whaam dong, Yuseong gu, Daejeon 305-348, South Korea; yjchoi@kasi.re.kr), ²NASA Jet Propulsion Laboratory (4800 Oak Grove Dr. MS 183-301, Pasadena, CA 91109, USA).

Introduction: The presence of coma around (60558) 2000 EC98 was first detected by Choi and Weissman (2006) on 2005 December 30.50 UT with the Palomar 5m telescope. Soon after, the object was given the periodic comet designation 174P/Echeclus (Green 2006). The dust production rate was 200-400 kg/sec in both the visual and IR (Choi et al. 2006). Total infrared fluxes for the coma, using the Spitzer Space Telescope in February 2006 and after removal of the nucleus signal at 24 μm and 70 μm , were about six times stronger than for the bare nucleus before the onset of activity (Bauer et al. 2006).

Observations during the seven months after the initial detection of activity showed that the apparent source of activity (the comet) moved away from the primary body (the Centaur) to a maximum distance of ~ 7 arc seconds in late February, 2006, then moved back towards and past the Centaur to ~ 9 arc seconds in late July, 2006. The first question was what the nature of the comet was, whether it was a fragment ejected from the Centaur at the onset of activity, or was it a companion of the Centaur. It appears the comet has an orbit that is very similar to that of the Centaur but independent, and it may not have been ejected from the Centaur at this apparition (Weissman et al. 2006). However, observations with the Palomar 5m telescope in December 2006 and the Kuiper 1.5m telescope in January 2007, showed no detectable cometary activity around the Centaur, nor the presence of the comet near its predicted position.

We could not detect any evidence of emission activity from the Centaur during Feb-Apr and June-July 2006 when the comet was sufficiently separated from the Centaur. Nevertheless, we cannot rule out that the comet was a fragment separated from the Centaur as a result of a major outburst or as a result of a collision with a small comet or asteroid. But if either of these is the case, then what is the reason that the Centaur is not active while the comet was active in 2005-2006?

A possible explanation for the activity of the comet is either that the comet had an outburst like Chiron or that the comet collided with other fragments of the Centaur that might exist in the same orbit. Thermal calculations for objects having similar orbits with 174P support the existence of the small comet indirectly, if the outburst was triggered by the water ice amorphous-to-crystal process in its interior. In that case the outburst is likely to last longer than 6 months, for objects larger than ~ 10 km diameter.

We will present the most recent observations performed at April and May 2008 using the CTIO SOAR 4.2m telescope and the Bohyunsan Optical Astronomy Observatory (BOAO) 1.8m telescope in Korea, respectively. We will also discuss the reason for the activity and the nature of the secondary.

References:

- [1] Choi, Y. J. & Weissman, P. R. 2006, *IAU Circ.* 8656
- [2] Choi, Y. J. & Weissman, P. R. 2006, *DPS*, 38, 3705
- [3] Bauer et al. (2008) *A&Ap*, accepted.