



The P/2010 A2 asteroid collision confirmed by Rosetta/OSIRIS observation

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The discovery of P/2010 A2 by the LINEAR survey in January 2010 [2] revealed an object displaying a large trail of material similar in shape to a cometary tail although no central condensation or coma could be detected. The appearance of this object in an asteroidal orbit in the inner main belt attracted attention as a potential new member of the Main Belt Comets class (MBCs) [4] but the discovery of a nucleus [6], with a diameter of 120 m [5], around 1500 km away from the trail implied that the extended object we were seeing could be the debris trail from a recent collision rather than the tail of a comet. Due to the low inclination of its orbit, it is difficult to conclude about the nature of P/2010 A2 from Earth-based data only, as different scenarios lead to the same appearance in the orbital configuration at the times of observations. We present here another set of images, acquired from the unique viewing geometry provided by ESA's Rosetta spacecraft [7] en route to comet 67P/Churyumov-Gerasimenko. Albeit faint (22 magnitude/arcsec²), the object could be observed by the high-resolution camera OSIRIS. We used a Finson-Probstein model [3, 1] to simulate the shape of the trail, and estimate the time of emission and β parameter (ratio between solar radiation pressure and gravity) for the dust grains. Simulations were compared to the OSIRIS images and ground based observations acquired at NTT and Palomar telescopes. Thanks to the different phase angle provided by Rosetta, we could reduce the number of solutions to a unique model, leading to the conclusive demonstration that the trail is not due to a period of cometary activity but to a single event which took place on 10 February 2009 \pm 5 days [7].

References

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