

A photometric and spectroscopic study of the multi-tailed asteroid (6478) Gault

Emmanuel Jehin (1) (ejehin@uliege.be), Fernando Moreno (2), Marin Ferrais (1), Francisco J. Pozuelos (1), Javier Licandro (3,4), Youssef Moulane (1,5,6), Maxime Devogele (7), Jean Manfroid (1), Zouhair Benkhaldoun (6) and Colin Snodgrass (8)

(1) Space sciences, Technologies & Astrophysics Research (STAR) Institute, University of Liège, Belgium (2) Instituto de Astrofísica de Andalucía, Granada, Spain (3) Instituto de Astrofísica de Canarias, La Laguna, Spain (4) Departamento de Astrofísica, Universidad de La Laguna, La Laguna, Spain; (5) European Southern Observatory, Santiago, Chile (6) Cadi Ayyad University, Marrakech, Morocco (7) Lowell Observatory, Flagstaff, U.S.A. (8) Institute for Astronomy, University of Edinburgh, Royal Observatory, Edinburgh, UK

Abstract

Main belt asteroid (6478) Gault, a member of the 25 Phocaea asteroid family was reported to have a comet-like tail on December 8, 2018, from ATLAS images, and early Finson-Probst analysis of those images revealed ejection of material in early November 2018 [6]. Follow-up imaging of the object by us [4] and various other teams revealed outbursts and the presence of other shorter and growing tail-like structures, associated to other ejection events [2,3,5]. The orbital elements of Gault are $a=2.305$ au, $e=0.194$, and $i=22.8$, so it is an inner main belt object with a Tisserand parameter with respect to Jupiter of $T=3.46$. This classifies Gault as a new member of the active asteroid population [1].

In this presentation, we describe several months of monitoring of Gault since January 2019 using various telescopes and instrumentation. The goal is to characterize and to model the asteroids and the tails to impose constraints on the physical properties of the ejected dust, and to shed light on the activity timeline and the causes for the ejection events.

References

- [1] Jewitt, D., Hsieh, H., and Agarwal, J. 2015, in *Asteroids IV*, Univ. of Arizona Press, Tucson
- [2] Jewitt, D., Kim, Y., Luu, J., et al. 2019, arXiv.org, arXiv:1904.07100
- [3] Lee, C.-H. 2019, *The Astronomer's Telegram*, 2468

[4] Moreno, F., Jehin, E., Licandro, J., et al. 2019, arXiv.org, arXiv:1903.09943

[5] Smith, K. W., Denneau, L., Vincent, J. B., Weryk, R., & Hale, A. 2019, *Central Bureau Electronic Telegrams*, 4594

[6] Ye, Q., Kelley, M. S. P., Bodewits, D., et al. 2019a, *The Astronomer's Telegram*, 2450