6478 GAULT MINOR PLANET OR COMET?

Full Name	Hsieh[7]	Jewitt[4]	Semi-major axis (a)	Perihelion (q)	Perihelion date	Cause
133P/Elst–Pizarro (7968 Elst–Pizarro, P/1996 N2)	Y	Y	3.15	2.64	2013-02-09	Impact/Cometary composition
176P/LINEAR (118401 LINEAR)	Y	Y	3.19	2.57	2011-07-01	Impact/Cometary composition
233P/La Sagra (P/2005 JR71)	N	N	3.04	1.79	2010-03-12	Impact/Cometary composition
238P/Read (P/2005 U1)	Y	Y	3.16	2.36	2011-03-11	Impact/Cometary composition
259P/Garradd (P/2008 R1)	Y	Y	2.72	1.79	2013-01-25	Orbit change
288P ((300163) 2006 VW$_{139}$)	Y	Y	3.05	2.44	2011-07-18	Cometary Composition
311P/PANSTARRS (P/2013 P5)	N	Y	2.19	1.95	2014-04-16	Rubble pile disintegration
313P/Gibbs (P/2003 S10)	N/A	Y	3.16	2.39	2014-08-28	Cometary composition
324P/La Sagra (P/2010 R2)	Y	Y	3.10	2.62	2015-11-30	Impact/cometary composition
331P/Gibbs (P/2012 F5)	N	Y	3.00	2.88	2010-03-26	Rubble pile disintegration
348P/PANSTARRS (P/2011 A5)	N/A	N	3.17	2.21	2016-06-21	?
354P/LINEAR (P/2010 A2)	N	Y	2.29	2.00	2013-05-23	Impact
358P/PANSTARRS (P/2012 T1)	Y	Y	3.15	2.41	2012-09-10	Impact/cometary composition
367P/Catalina (P/2011 CR42]]	N/A	N	3.51	4.49	2011-11-29	?
P/2013 R3-A (Catalina-PANSTARRS)	Y	Y	3.03	2.20	2013-08-05	Rubble pile disintegration
P/2013 R3-B (Catalina-PANSTARRS)	Y	Y	3.03	2.20	2013-08-05	Rubble pile disintegration
P/2014 C1 (TOTAS)	N/A	N	3.04	1.69	2013-12-18	?
P/2015 X6 (PANSTARRS)	N/A	Y	2.75	2.29	2016-03-18	Rubble pile disintegration or cometary composition
P/2016 G1 (PANSTARRS)	N/A	Y	2.58	2.04	2017-01-26	Impact
P/2016 J1-A (PANSTARRS)	N/A	Y	3.17	2.45	2016-06-24	Impact/Cometary composition/Rubble pile disintegration
P/2016 J1-B (PANSTARRS)	N/A	Y	3.17	2.45	2016-06-24	Impact/Cometary composition/Rubble pile disintegration
P/2016 P1 (PANSTARRS)	N/A	N	3.23	2.28	2015-09-07	?
P/2017 S5 (ATLAS)	N/A	N/A	3.17	2.18	2017-07-27	?
P/2017 S8 (PANSTARRS)	N/A	N/A	2.78	1.68	2018-01-28	?
P/2017 S9 (PANSTARRS)	N/A	N/A	3.16	2.20	2017-07-23	?
P/2018 P3 (PANSTARRS)	N/A	N/A	3.01	1.76	2018-10-09	?
P/2019 A3 (PANSTARRS)	N/A	N/A	3.15	2.31	2018-08-01	?
P/2019 A4 (PANSTARRS)	N/A	N/A	2.61	2.36	2018-11-28	?
P/2019 A7 (PANSTARRS)	N/A	N/A	3.19	2.68	2018-01-08	?
493 Griseldis	N	N	3.12	2.57	2019-02-15	Impact
596 Scheila	N	Y	2.92	2.44	2012-05-19	Impact
6478 Gault	N	N	2.31	1.86	2020-01-02	Impact
(62412) 2000 SY$_{178}$	N	Y	3.15	2.90	2018-10-29	Rubble pile disintegration

P/2013 P5: Hubble Spots Bizarre Asteroid with Six Comet-Like Tails

Nov 8, 2013 by News Staff / Source

A group of scientists using NASA's Hubble Space Telescope has discovered a unique multi-tailed object, labeled P/2013 P5, in the main asteroid belt.

331P, 338P AND 596 SHILA

06 Scheila 2010-12-27 UT 20.38 8x360sec 8"f2.8 M.Jäger

1. Ausbruch 28.10.2018   Dauer 7-10 Tage   Massenverlustraten vom Kern betragen 10 bis 20 kg   mittlerer Teilchenradius 100 Mikrometern
2. Ausbruch 31.12.2018
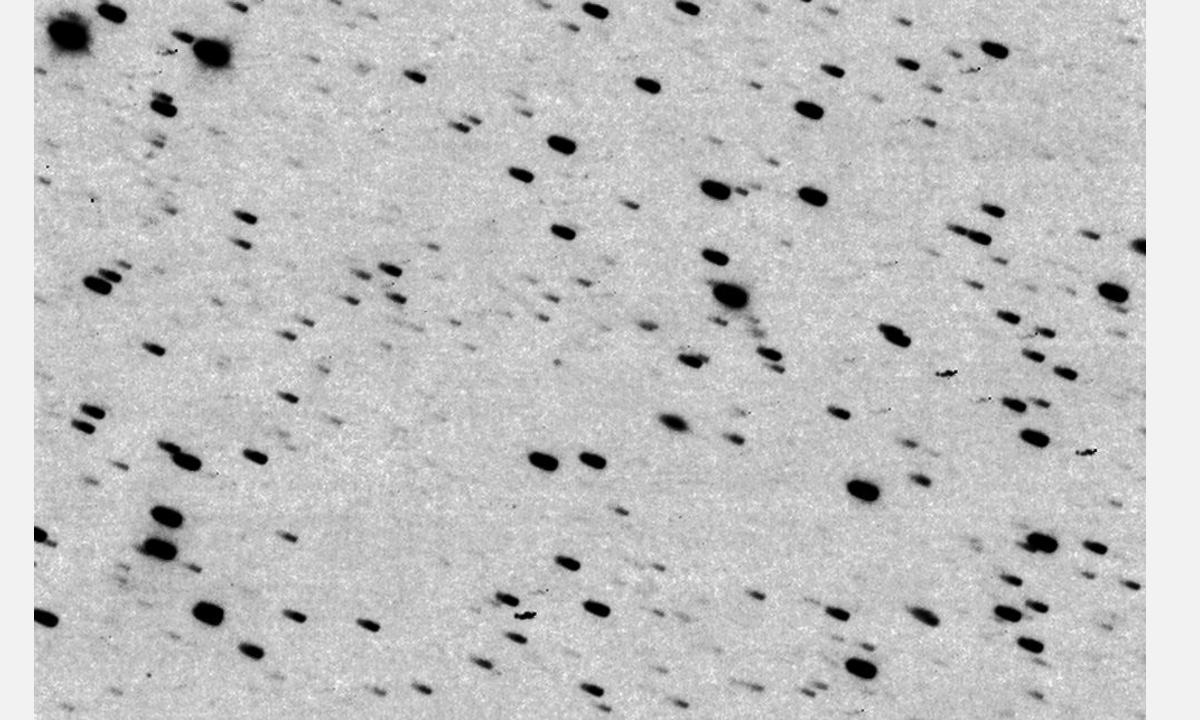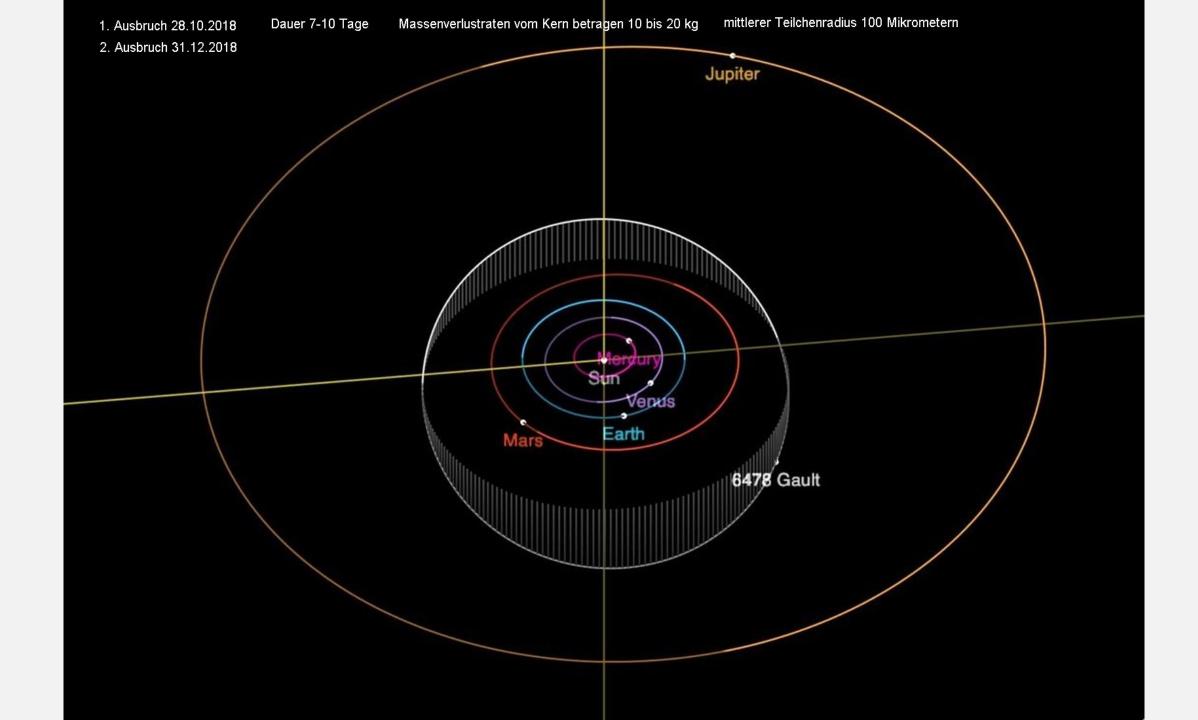
1. INTRODUCTION

Active asteroids like (6478) Gault (Figure 1, this work) are dynamically asteroidal objects but they uncharacteristically manifest cometary features such as tails or comae (Hsieh & Jewitt 2006a). With only ~20 known to date (see Table 1 of Chandler et al. 2018), active asteroids remain poorly understood, yet they promise insight into solar system volatile disposition and, concomitantly, the origin of water on Earth (Hsieh & Jewitt 2006b).

Active asteroids are often defined as objects with (1) comae, (2) semi-major axes interior to Jupiter, and (3) Tisserand parameters with respect to Jupiter $T_J > 3$; T_J describes an object's orbital relationship to Jupiter by

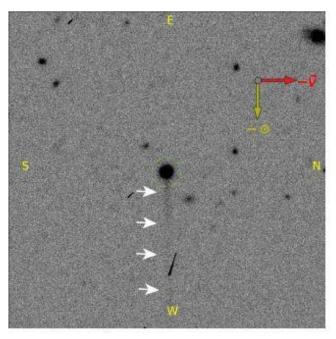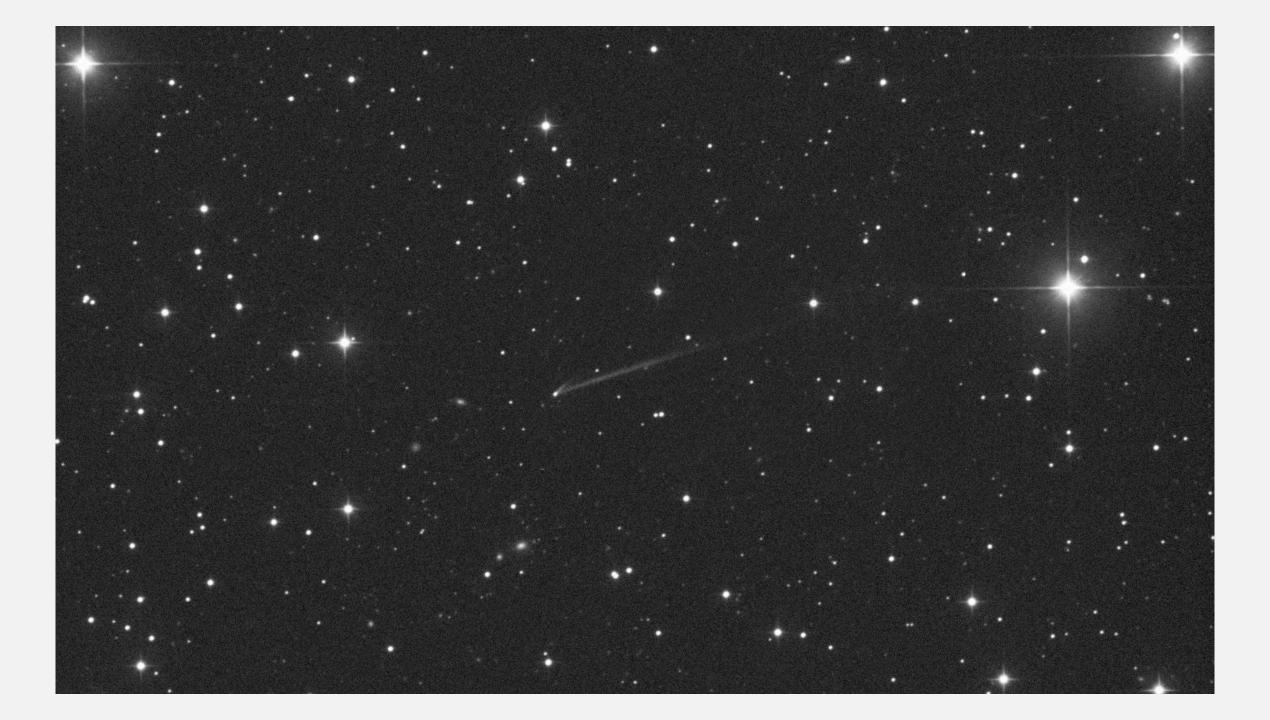Corresponding author: Colin Orion Chandler
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Figure 1. (6478) Gault (dashed green circle) displays a prominent tail (indicated by white arrows) during this September 28, 2013 apparition when (6478) Gault was halfway between perihelion and aphelion. This 90-second g-band exposure reached ~7 magnitudes fainter than (6478) Gault. The anti-Solar direction ($-\odot$; yellow) and negative heliocentric velocity vector ($-\vec{v}$; red) are shown.

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below), and cryovolcanism (e.g., (1) Ceres, Küppers et al. 2014; Witze 2015). Physical interaction, or "rubbing binary", has been pro-

$$T_J = \frac{a_J}{a} + 2\sqrt{\frac{a\,(1-e^2)}{a_J}}\cos(i) \qquad (1)$$

GIF ANIMATIONEN

February 2, March 8, April 6 and 27