PURSUIT OF ZΩH — THE WEEKLY

This Week in Astrophysics

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THIS WEEK

A black hole's ring holds, and a planet slips from view

A giant star's outbursts betray a compact partner, a new method recovers M87*'s ring, a hot Jupiter's transits vanish, and an asteroid turns comet-like.

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01 MASSIVE STARS

A restless giant star's outbursts point to a hidden compact partner

AT 2016blu, in the spiral galaxy NGC 4559 about 30 million light-years away, is a supernova impostor: a luminous blue variable of at least 33 solar masses that keeps erupting without dying.[1,2] It produced 27 detected outbursts between 2012 and June 2026, spaced roughly 113 days apart.[1] Mojgan Aghakhanloo of the University of Virginia and colleagues triggered Chandra in March 2026 and found X-rays, log $L_X \approx 38.64 \pm 0.11$ erg s^{-1}, where stacked 2001–2002 archival images showed none.[1,2] That output implies matter falling onto a compact companion.[1]

WHY IT MATTERS

It is the first known LBV impostor where X-rays clearly favor on-and-off accretion onto a compact object as the cause of the outbursts, which makes the system a high-mass X-ray binary.[1]

CAVEAT *The companion is not seen directly; NASA describes it as either a stellar-mass black hole or a neutron star.*[2]

~113 days

spacing of AT 2016blu's outbursts, read as periastron passages in an eccentric binary

SOURCE 1

[1] doi:10.3847/1538-4357/ae9a86 · [2] science.nasa.gov

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02

BLACK HOLE IMAGING

A second imaging method recovers the ring around M87*

Some outside reanalyses of Event Horizon Telescope data had questioned whether the famous image of M87*, the black hole at the core of the galaxy Messier 87, really shows a ring.[3] Samuel Lai and colleagues at CSIRO wrote their own algorithm, GenDIReCT, which works from closure invariants, combinations of measurements that calibration errors cannot corrupt, and assumes no shape in advance.[3,4] Applied to public 1.3-mm EHT data from 2017, 2018 and 2021, it returned a ring with an angular diameter of 42.2 ± 1.5 μas.[3]

WHY IT MATTERS

Under nominal scaling assumptions, that ring corresponds to a black hole of 6.5 ± 0.5 billion solar masses, seen about 20° from its approaching jet.[3]

CAVEAT *This is a new analysis of existing EHT measurements, not new observations.*[3,4]

[3] doi:10.1038/s41586-026-11241-9 · [4] csiro.au

42.2±1.5 μas

angular diameter of the M87* ring recovered with closure invariants (EHT data, 2017–2021)

SOURCE 3

03

EXOPLANETS

A hot Jupiter's transits slide off its star and disappear

TOI-2535 b is a hot Jupiter that circles a star about 1,000 light-years away every 8.25 days.[5,6] Over 7 yr of TESS photometry, a team led by Samuel Yee of UCLA watched its path across the star creep outward until it missed the disk entirely, the first planet around a single star seen to lose its transits.[5,6] The impact parameter changed by 0.16 per year, and transit times strayed by ±6 hr.[5] Modeling points to a neighbor of Saturn mass or more, tilted by at least 5° and probably in resonance.[5]

WHY IT MATTERS

It is one of the most extreme cases of planets reshaping each other's orbits on human timescales, and UCLA says the transits should return in 30 to 50 years.[5,6]

CAVEAT *The perturbing planet is inferred from its pull on TOI-2535 b, not detected directly.*[5,6]

[5] doi:10.3847/2041-8213/aeb4a4 · [6] newsroom.ucla.edu

0.16 yr^{-1}

rate of change of TOI-2535 b's transit impact parameter over 7 yr of TESS data

SOURCE 5

04

SMALL BODIES

Asteroid 6993 wakes up, possibly the largest main-belt comet

A team led from Northern Arizona University, helped by machine learning, spotted activity on the outer-main-belt asteroid 6993 (1995 BJ4) in the Zwicky Transient Facility alert stream on 5 August 2026.[7] Earlier images show it active as early as 25 June.[7] The authors argue that fast spin is probably not the main driver, leaving an impact or sublimating ice.[7] If ice is responsible, 6993 is the largest known main-belt comet, at 11.85 km, with the largest perihelion distance, 2.853 au, and an unusually high geometric albedo of 0.166 ± 0.030.[7]

WHY IT MATTERS

Watching 6993 as it nears perihelion in January 2027 should tell the two explanations apart and show what ices it may hold.[7]

CAVEAT *Impact versus sublimation is still open, so the record is conditional.*[7]

[7] doi:10.3847/2041-8213/aeb92e

11.85 km

size of 6993, the largest known main-belt comet if its activity is sublimation-driven

SOURCE 7

WORDS THIS WEEK

Luminous blue variable
A very massive, unstable hot star that brightens and sheds mass in irregular eruptions.

Supernova impostor
An eruption bright enough to be mistaken for a supernova, after which the star is still alive.

Closure invariant
A combination of interferometer measurements from groups of antennas that cancels each antenna's own calibration errors.

Impact parameter
How far from the star's center a planet's path crosses its disk, in stellar radii; above about 1, the planet misses the star.

Main-belt comet
An object on an asteroid orbit between Mars and Jupiter that sheds dust like a comet, often from sublimating ice.

SOURCES

1. PAPER M. Aghakhanloo et al., “AT 2016blu: Accretion-powered Outbursts in a Luminous Blue Variable and Compact Object Binary,” The Astrophysical Journal (9 Nov 2026). doi:10.3847/1538-4357/ae9a86
2. AGENCY “NASA’s Chandra Finds Source of Star’s Mysterious Outbursts,” NASA (9 Nov 2026). https://science.nasa.gov/missions/chandra/nasas-chandra-finds-source-of-stars-mysterious-outbursts/
3. PAPER S. Lai et al., “Independent interferometric observable confirms black hole shadow in M87*,” Nature (11 Nov 2026). doi:10.1038/s41586-026-11241-9
4. RELEASE “New CSIRO technique confirms iconic black hole image,” CSIRO (12 Nov 2026). https://www.csiro.au/en/news/All/News/2026/November/confirm-black-hole
5. PAPER S. W. Yee et al., “A TESS Disappearing Act: The Vanishing Transits of TOI-2535 b,” The Astrophysical Journal Letters (9 Nov 2026). doi:10.3847/2041-8213/aeb4a4
6. RELEASE “First known ‘disappearing planet’ has a neighbor that makes it wobble like a top,” UCLA Newsroom (9 Nov 2026). https://newsroom.ucla.edu/releases/first-known-disappearing-planet-neighbor-wobble-like-top
7. PAPER E. M. Clark et al., “Discovery of Activity on Main-belt Asteroid 6993 (1995 BJ4),” The Astrophysical Journal Letters (10 Nov 2026). doi:10.3847/2041-8213/aeb92e

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