THREE OUTBURSTS OF COMET 10P (TEMPEL)

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Comet 10P/Tempel 2, a short-period comet discovered by W. Tempel in Milan, reached perihelion on August 2, 2026, at a heliocentric distance of 1.42 AU (JPL Horizons). Photometric measurements from ZTF images showed a smooth and progressive brightening before perihelion, without significant short-term fluctuations. Post-perihelion observations revealed a transition to a more unstable activity regime, first indicated by the small apparent outburst reported on August 16, 2026, by Kelley et al. (ATel #17985).
A detailed analysis of publicly available images from Las Cumbres Observatory (LCO) telescopes revealed sudden and short-lived morphological changes in the inner coma, consistent with at least three distinct outburst events detected during the following observing intervals:

1. September 14–16, 2026 (Images taken at LCOGT node at Haleakala Observatory – ogg. Proposal ID: TSO2026B-001. Group ID: 10P 2m 4x30s)
2. September 29–October 1, 2026 (LCOGT node at Siding Spring Observatory – coj. Proposal ID: TSO2026B-00. Group ID: HU-10P-rotation-test)
3. October 25–26, 2026 (LCOGT node at Haleakala Observatory – ogg. Proposal ID: TSO2026B-001. Group ID: 10P_2m_INSAlcarras_ACano_DRPodar_JMPerez)

The images acquired with the g, r, i, and z filters during each observing session were aligned on the optocenter, assumed to coincide with the nucleus, and co-added to improve the signal and combine information across a broad spectral range. The stacked images were then processed with 1/ρ and Larson–Sekanina (α = 20°) filters to examine the inner-coma morphology during the outbursts.
The September 14 and October 25 outbursts show similar geometries, whereas the September 29 event appears to have originated in a different active region.
By comparing morphological structures identifiable at subsequent epochs (dust clumps positions measurable also on polar-transformed images), we derived expansion velocities projected onto the plane of the sky of 135 ± 6 m s^{-1} and 148 ± 14 m s^{-1} for the September 14 and October 25 events, respectively.
The widespread diffusion of the structures generated by the outbursts, already apparent the day after the event, indicates the simultaneous emission of dust particles with a broad range of diameters and masses.

This work makes use of observations from the Las Cumbres Observatory global telescope network.

Calibration details, figures and captions are available at:
https://web.oapd.inaf.it/bedin/files/PAPERs_eMATERIALs/ATel/10P/