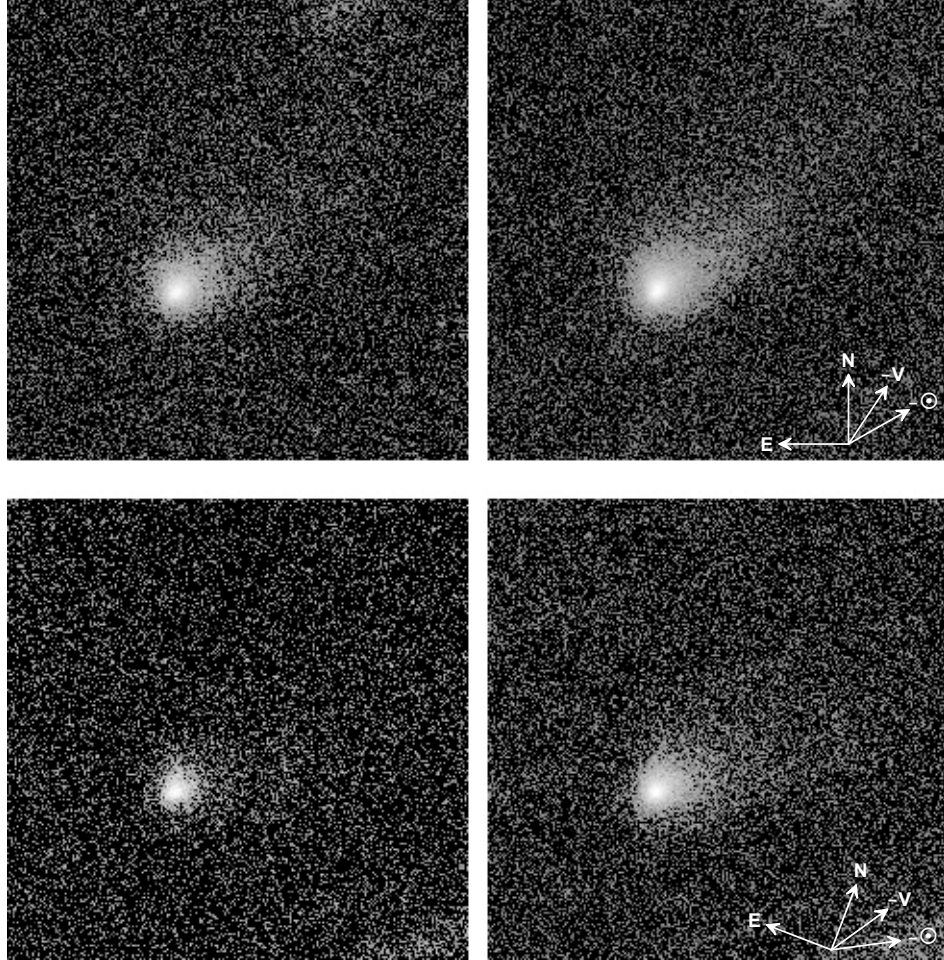


In the format provided by the authors and unedited.

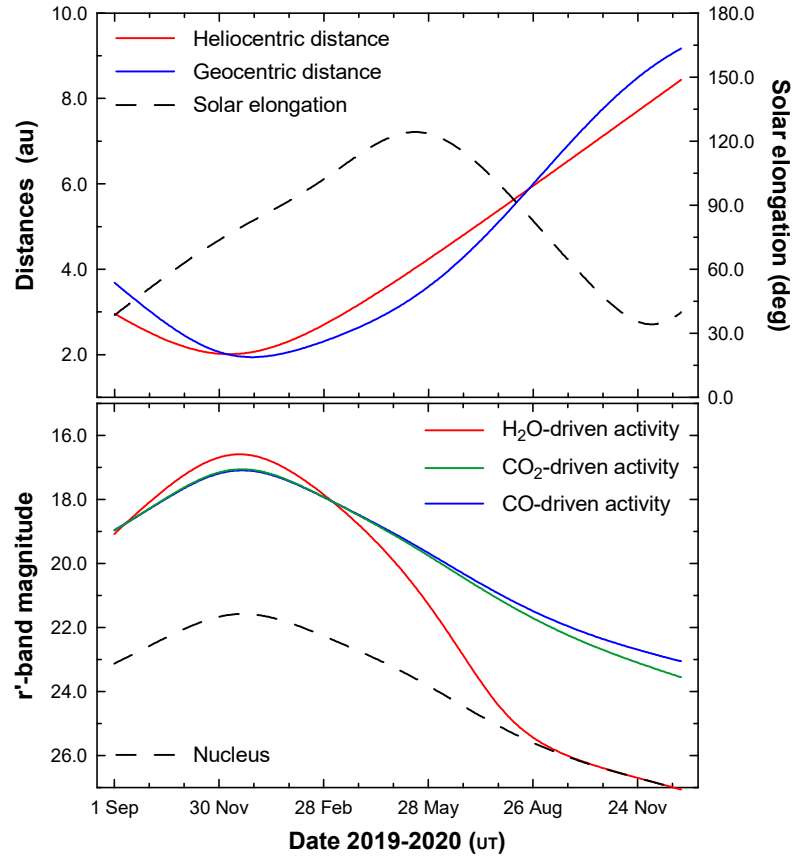
Initial characterization of interstellar comet 2I/Borisov

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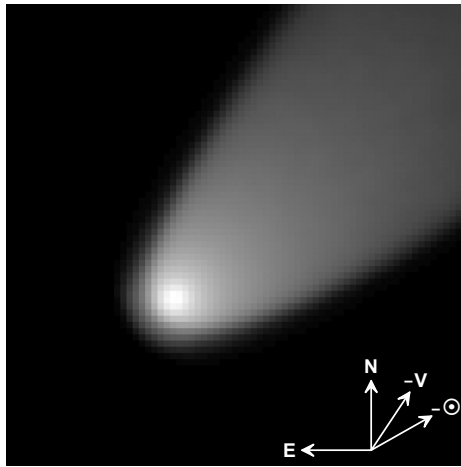
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Supplementary Fig. 1 | Median-stacked images of 2I/Borisov from the William Herschel Telescope. Top panels show the images obtained on 10 September 2019 at 05:38 UT and bottom panels show the images obtained on 13 September 2019 at 05:47 UT (observation mid-points). The images in the left panels were obtained in the g' band and the images in the right panels were obtained in the r' band. All panels subtend 1.0×1.0 arcmin and are scaled logarithmically. Arrows show the directions of north (N) and east (E), the projected antisolar vector ($-\odot$) and the negative of the orbital velocity vector ($-V$). The pixel scale is $0.25 \text{ arcsec px}^{-1}$ and the seeing was 1.3 arcsec on both nights. The data from 13 September 2019 UT are affected by stronger twilight and moonlight, and possibly also by a thin cirrus cloud, resulting in the reduced apparent coma size.



Supplementary Fig. 2 | Visibility prospects of 21/Borisov for years 2019 – 2020. Top panel presents basic geometric circumstances and bottom panel shows r' -band magnitude in a 5,000-km radius aperture extrapolated from our Gemini North and WHT photometric data of 10 September 2019 UT. The magnitude is forecasted using three different activity models, in which the heliocentric brightness of the coma follows the sublimation curves of H₂O, CO₂ and CO computed in a standard manner with an assumed Bond albedo of 4% and emissivity of 100%. The actual observed magnitude additionally accounts for the nucleus brightness (we assumed a 4% geometric albedo and a 0.04 mag deg⁻¹ phase function), phase function of the coma (0.02 mag deg⁻¹), and geocentric term (inverse square law for brightness).



Supplementary Fig. 3 | Synthetic image of 2I/Borisov computed with our Monte-Carlo code. The model was fitted to the r' -band image obtained at Gemini North on 10 September 2019 at 14:57 UT (Fig. 2, right panel) and has the same orientation and scale. See Methods for details of the computation.