

środa 7 Maja godz. 14:00

ul. Pasteura 7, sala 404

transmisja on line

<https://us06web.zoom.us/j/81204538045?pwd=SVXyy7ygOMwsGPDQblmpbGbVMssNzE.1>

Identyfikator spotkania: 812 0453 8045

Kod dostępu: 301057

Dr. Andrew Fraser Gillan

(Queen's University Belfast, belfast, UK)

Activity in Jupiter-family comets and asteroids: photometric analysis of survey and deep imaging

Jupiter-family comets (JFCs) exhibit a wide range of activity levels and mass loss over their orbits. Using over 34,000 images, we analysed 116 active JFCs with the Asteroid Terrestrial-impact Last Alert System (ATLAS), focusing on those reaching perihelion from 2020–2023. The dust production rates were measured via the Afp parameter, showing most JFCs reach a peak in activity post-perihelion, typically within 2.5 au of the Sun, likely driven by water-ice sublimation. We measured the activity indices of 56 JFCs and found that on average, the rate of change of activity post-perihelion was shallower than pre-perihelion. We also identified five JFC nuclei with no visible coma, estimating upper limits for their radii, consistent with previous studies. Additionally, eleven outbursts were detected, with magnitude increases ranging from -0.2 to -2.8, matching typical JFC behaviour.

In a complementary study we explored the evolution of short-period comets, and we observed 16 asteroids on comet-like orbits to search for low-level activity using the Isaac Newton Telescope on La Palma. Surface brightness profiles indicated low-level activity in three asteroids, suggesting reclassification as weakly sublimating cometary nuclei. Our findings imply that up to 33% of objects in the 3.16–4.56 au range may exhibit low-level activity.

At the NCBJ, I will contribute to expanding the Black Hole Target and Observation Manager (BHTOM) to support solar system targets for the first time. In parallel, I will utilise data from the upcoming Legacy Survey of Space and Time (LSST) at the Vera C. Rubin Observatory, alongside BHTOM, to measure the dust production rates of the entire Jupiter-family comet population across their full orbits — a study that has never previously been performed at this scale.

Serdecznie zapraszam,

William Pearson, on behalf of the SOC