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TRAPPIST results of the Didymos system after the DART mission

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The aftermath of one of the most known Planetary Defence missions, is still intensely studied. The DART space mission to test kinetic impact deflection, successfully impacted Dimorphos, the moon of the binary asteroid Didymos and it's primarily objective was achieved by altering the orbital trajectory of the asteroid. The collision ejected sufficient mass to transform Dimorphos into the first made-made active asteroid (Chabot L. N. et al., 2024).

Using the TRAPPIST twins located in Morocco and Chile (Jehin E. et al., 2011), respectively, we observed the evolution of the ejecta tail formed after the DART impact on Dimorphos. We obtained photometric data for several months before and after the impact, and the measurements and analysis obtained focused on the tail's morphology, mass determination, color indices, ejecta dynamics and composition.

We present a preliminary mass estimate of the ejecta tail derived from the photometric measurements using the COMETails pipeline (Moreno F., 2025), as we modeled the tail's formation and evolution, constraining the ejecta particle velocity, size distribution and the total mass of the dust. We also present the characteristics and evolution of the additional tails that were present shortly after the impact and that were visible for a shorter period of time.

Considering the most important aspect of the impact, the modified trajectory of Dimorphos, we also determined from TRAPPIST lightcurves the orbital change in the rotational period by analysing the mutual events of the system the few weeks before and after the impact.

These results complement the previously published ground-based observations and, when analyzed together with impact and dynamics models, provide better constraints on impact-driven ejecta dynamics and contribute to a broader understanding of asteroid deflection techniques.