

ABSTRACT ONLY**REVIEWING COMETARY-LIKE ASTEROIDS
IN VIEW OF THE DART EXPERIMENT**G. Tancredi¹

Several objects in asteroidal orbits have presented comae and tails like the ones presented by comets. There are at present (12/2023) 46 objects that have presented, at least for a brief period, this cometary-like appearance. These objects are generally coined “Active Asteroids”, implicitly implying that some kind of on-going endogenous or exogenous active process is the mechanism that produce the long-lasting tails. Nevertheless, what we observe is that those asteroids are temporally dressed as comets. Several hypotheses have been proposed to explain the “activity” of these objects.

Lessons from DART: The NASA-DART experiment gave us an opportunity to review our knowledge of this population. Following the impact of the space probe against asteroid Dimorphos on September 26, 2022, several thousand tons of material were ejected at a wide range of velocities. Tancredi et al. (2023) dubbed the DART experiment as the creation of the first artificial “Active Asteroid”. They proposed that the production of a large amount of low-speed ejected material could be described by the “cocoa effect”: the lofting of small particles from the top of a dust layer by shaking the ground. The seismic shaking, combined with the “cocoa effect,” may lead to the ejection of particles from a significant portion of the affected hemisphere. They predicted a brightness increase due to a slowly moving dust cloud, the obscuration of Dimorphos’ surface by this cloud, and the generation of a long-lasting tail; which were confirmed by the close-by observations of LICI-ACube, as well as long-range tracking from HST and the ground. By July 2023, over 250 days after impact, the tail was still visible.

Based on these results, we reviewed the relevance of the different mechanism proposed to explain the appearance of the population of asteroids temporally dressed as comets.

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