

Small Bodies, Big Impacts: Earth Impactors & The Double Asteroid Redirection Test

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When Solar System scientists talk about the effect of planetary impacts, much of the attention is focused on the most energetic and largest impacts -- but what can we say about the effect that the smallest (and most common!) impactors have? In this talk, I will discuss how two recent results from telescopes, spacecraft, and meteor camera networks are making rapid progress in understanding how impactors even just a few meters in diameter can result in significant effects on the worlds they alter and in turn how understanding these small-scale impacts can help us understand the properties of the smallest asteroids and comets in greater detail.

First, I will discuss the results of a globe-spanning observing campaign after the impact of the Double Asteroid Redirection Test (DART) spacecraft into a moon around the asteroid Didymos, Dimorphos, which revealed strong evidence for a later secondary re-impact in the system -- and thus continuing evolution weeks and months after the initial impact. Second, I will discuss results from an international campaign to measure the properties of the Earth Impactor 2022 WJ1 prior to and during its disintegration over Toronto in November 2022. This both allowed for a first-ever direct comparison of asteroid characterization techniques and fireball observations and also showed that 2022 WJ1 was the smallest asteroid ever physically characterized in space. Lastly, I will discuss how these and other results might inform searching for similar behaviors and objects in the Rubin Observatory / LSST era.



BIO: Dr. Theodore (Teddy) Kareta is a planetary astronomer and postdoctoral researcher at Lowell Observatory in Flagstaff, AZ, USA. He studies the composition and orbital evolution of comets and asteroids with ground and space based telescopes and numerical modeling. He received his Ph.D. from the University of Arizona in 2021 and his Bachelor's degree from the University of Massachusetts in 2017. When he's not doing science or mentoring students, he enjoys nature photography and hiking-and-biking around the Southwest.