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OBSERVATIONS OF DIDYMOS IN SUPPORT OF AIDA/DART

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ABSTRACT

The binary near-Earth asteroid (65803) Didymos is the target for the Asteroid Impact and Deflection Assessment (AIDA) mission, which is a concept with two spacecraft:

NASA’s DART (Double Asteroid Redirection Test) impactor and ESA’s Hera orbiter. The DART mission is scheduled to impact the Didymos secondary during its apparition in 2022. One key scientific goal of both AIDA missions is to measure and characterize the deflection caused by the impact. A combination of spacecraft and ground and space based optical and radar observations in 2022 will provide the required data for AIDA and, specifically DART, to meet its top-level mission goals.

We will observe the Didymos system during the 2019 and 2020-2021 apparitions to further characterize the system by obtaining additional lightcurve observations and spectra. These planned observations would provide us with the opportunity to establish the state of the system before impact to a high level of precision. We will place additional constraints on the inclination of the satellite orbit, the long-term effects of Binary YORP (BYORP), and whether the satellite is in synchronous rotation with the primary. The Didymos apparitions in 2019 (peak V=19.8) and 2020-2021 (peak V=18.9) will be much fainter than that in 2022 (peak V=14.5). Therefore, our upcoming campaigns are focused on medium to large aperture ground-based facilities for these two apparitions. Our 2019 observations will occur between late January and mid-April 2019. While observations will be concluded before the meeting, we anticipate that our analysis will not be complete. We will present our results from previous observations (through 2017) and selected preliminary results from our 2019 observations. We will also discuss the timing of the 2020-2021 observing campaign.