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**Ongoing and Upcoming Mission Highlights**

**Key International and Policy Developments**

**Near-Earth Object (NEO) Discovery**

**NEO Characterization**

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**Space Mission & Campaign Design**

**Impact Effects & Consequences**

**Disaster Management & Impact Response**

**Public Education and Communication**

**The Decision to Act: Political, Legal, Social, and Economic Aspects**

**JWST OBSERVATIONS OF THE DIDYMOS-DIMORPHOS SYSTEM**

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**ABSTRACT**

NASA's DART (Double Asteroid Redirection Test) impacted Dimorphos, the secondary of the near-Earth binary asteroid (65803) Didymos, on September 26,

2022, in the first test of kinetic impact for asteroid deflection. Telescopes around the world and in space monitored the Didymos-Dimorphos system before, during, and after the impact to study the change in Dimorphos' orbital period, the evolution of the ejecta, and the physical properties of the target bodies. The JWST observations are part of this large effort and were obtained as part of Guaranteed Time Observation (GTO) program #1245.

JWST observed the Didymos system with NIRCcam over a period of approximately 5 hours before and after impact. The successful Didymos impact observations used non-sidereal tracking at a rate greater than three times the then-nominal JWST tracking rate of 30 mas/s. These observations show the evolution of the ejecta near the asteroids in the hours after impact with a resolution of  $\sim 1.7$  km/pixel on the short wavelength detector. A second set of NIRCcam observations taken on December 9 show the state of the ejecta closest to Didymos and Dimorphos at that time (short wavelength resolution  $\sim 4.1$  km/pix).

We also obtained NIRSpec fixed slit spectroscopy (0.6-5.3 microns) and MIRI medium resolution spectroscopy (4.9-27.9 microns) in early December. At that time, a large fraction of the ejecta had moved to the tail so our spectral data were dominated by light from Didymos. The spectroscopic data will enable detailed studies of the composition and physical properties of the target asteroid system. The NIRSpec data show significant thermal excess and we performed an independent assessment of Didymos' thermal properties. The MIRI spectra have spectral features consistent with S-type, ordinary chondrite-like objects.

We will discuss the results of our JWST observations and compare our results to other imaging and spectroscopy programs within our DART collaboration.

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**Comments:**

*(Alternative session, Time slot, Oral or Poster, Etc...)*