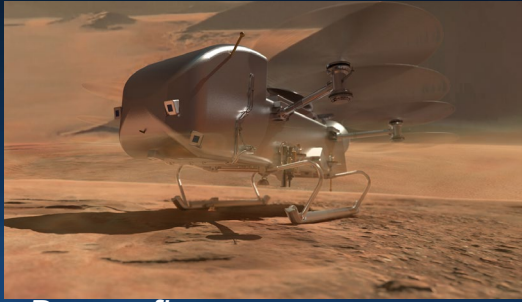




Precision measurements for planetary nuclear spectrometers



Dragonfly



Psyche

The gamma ray spectrometers onboard future NASA missions such as Dragonfly and Psyche (shown above) will be able to measure the surface composition with higher precision thanks to this work.

We showed in a proof-of-concept experiment that we can measure specific nuclear interaction probabilities that will aid in the interpretation of data from previous planetary nuclear spectrometers and increase the precision of future instruments.

- Notable past missions with nuclear spectrometers: DAWN, Mars Odyssey, Lunar Prospector, and MESSENGER.
- Nuclear interaction probabilities for some major and minor elements present on planetary surfaces either have large errors, are missing, or are inconsistent in current worldwide nuclear databases.
- We designed an experiment that brought together a team from three institutions (NASA GSFC, Berkeley Lab, and Johns Hopkins University Applied Physics Lab), and we were able to successfully measure these probabilities in a novel, more precise, and cost-effective way.
- We will now measure these probabilities for all elements relevant to planetary surfaces and update our national nuclear databases.