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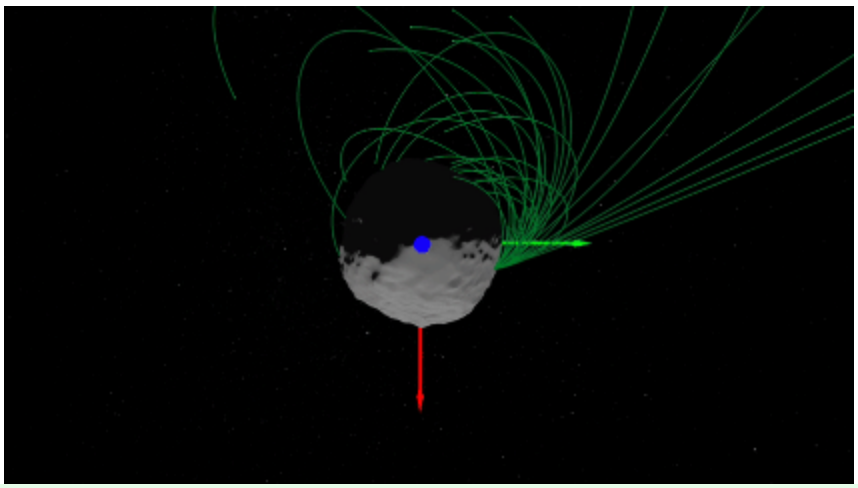
Quick Views of Big Advances

Bennu–Active Asteroid

Since entering orbit around asteroid Bennu in December 2018, NASA's OSIRIS-REx spacecraft has returned outstanding images as it surveys the surface in preparation for its touch-and-go sampling maneuver scheduled for 2020. During the orbital surveys, the OSIRIS-REx science team observed something else altogether: multiple particle-ejection events from the asteroid's surface (see **PSRD** article: ***Active Asteroids***). Explaining why Bennu is ejecting particles is a hot topic.



Animation showing the modeled trajectories of particles that were ejected from the surface of asteroid Bennu on January 19, 2019 based on data from NASA's OSIRIS-REx mission. Ejected particles either briefly orbited Bennu and fell to its surface or escaped away into space. Credit: NASA / Goddard / University of Arizona / Lauretta & Hergenrother et al., Science 10.1126/science.aay3544. ***Click*** to view the mission page for download options.

To address how and why Bennu is releasing 1–10-centimeter-sized particles Dante Lauretta and Carl Hergenrother (University of Arizona) and coauthors from the OSIRIS-REx science team studied the ejection events. They examined details of the three largest observed events, tracking particle paths and velocities, determining particle sizes, albedos, and densities. They also studied the event times, source regions, and energies involved in the particle ejections, all toward determining the most plausible mechanisms among the multiple hypotheses considered. All the events they studied occurred in the late afternoon but originated from different sites on the asteroid, which they describe as appearing no different geologically from any other area on Bennu's surface. After considering all the data gathered to date, Lauretta and colleagues suggest the most likely mechanisms are thermal fracturing, volatile release by dehydration of ***phyllosilicate*** rocks, and ***meteoroid*** impacts.

After collection in 2020, the asteroid samples are scheduled for delivery to Earth in September 2023.

See Reference:
· Lauretta, D. S., Hergenrother, C. W., and 57 others (2019) Episodes of Particle Ejection from the Surface of the Active Asteroid (101955) Bennu, *Science,* v. 266, eaay3544, doi: 10.1126/science.aay3544. [***abstract***]

See also:
· ***Latest News from NASA's OSIRIS-REx Mission***.

· Martel, L. M. V. (May, 2019) Active Asteroids, *PSRD,* ***www.psrd.hawaii.edu/May19/active-asteroids.html***.

· ***NASA's OSIRIS-REx Mission Explains Bennu's Mysterious Particle Events*** news item.

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