

# The role of cohesive strength in the evolution of asteroid interiors and surfaces

\*Daniel Jay Scheeres<sup>1</sup>, Paul Sanchez<sup>1</sup>

1. University of Colorado Boulder

Recent observations and theory have indicated that rubble pile asteroids have a small, but finite, level of tensile strength, allowing them to spin above their spin-deformation limit. In Sanchez and Scheeres (2014) a theory for how such strength could be present in rubble pile asteroids was presented, relying on weak van der Waals forces between fine particulate material in asteroid regolith and in their interiors. The upcoming sample return missions Hayabusa2 and OSIRIS-REx will provide unprecedented insight into the strength of an asteroid's surface regolith covering, which will in turn provide insight into the genesis of tensile strength within rubble pile bodies. This talk will review the implications of cohesion for surface sampling on a rubble pile asteroid, discuss methods of interpreting surface interactions that can shed light on the strength of the regolith covering, and discuss possible differences between rocky S-type asteroids such as Itokawa and the C-type asteroids Ryugu and Bennu, target of the upcoming sample return missions. Specific predictions of this model for the physical evolution of these bodies will then be presented and discussed.

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