

Title: Bulk cohesive strength of small bodies: understandings and issues.

Abstract: Recently studies have shown that small bodies may have mechanical strength, which is characterized by friction and bulk cohesive strength. Detailed observations and exploration missions of small rubble pile asteroids have shown their unique shapes and geomorphological features under severe structural conditions. Such features have been used to give constraints on their geophysical properties including the bulk cohesive strength. One of primary contributors to the cohesive strength is usually interpreted to be part of the influence from van der Waals forces in rubble pile asteroids; however, other forces may also be critical, depending on their conditions. While a typical bulk cohesive strength may be ~ 200 Pa or less for small bodies with sizes of a few hundred meters. However, further analyses have shown that there are exceptional cases that some asteroids may have higher cohesive strength to explain their geophysical conditions. This may be indicative of potential limits of the currently established asteroid geophysical theories and the necessity of further improvements. This talk will introduce these issues to enhance further discussions about the strength of small bodies.

Bio: Masatoshi (Toshi) Hirabayashi is an assistant professor of Aerospace Engineering at Auburn University. Currently, he is leading the Space Technology Application Research (STAR) laboratory. He has participated in multiple space missions: Hayabusa (Japan's first asteroid sample return mission), IKAROS (World's first solar sail mission), Hayabusa2 (Japan's second asteroid sample return mission), and DART/AIDA (World's first asteroid deflection mission).

