Our understanding of the solar system’s small asteroids has progressed significantly over the last decades. These advances are due to space missions that have visited these bodies, international observing campaigns that have discovered and characterized these bodies, and significant advances in theory and simulation that allow us to probe the physics of these bodies. This intense focus has also exposed many new mysteries about their physical evolution, interior structure, and geophysical and geotechnical properties. The implications of these newly exposed questions go beyond asteroids, and can be related to planetary rings, proto-planetary discs, and the aftermath of catastrophic collisions between asteroids. Importantly, these open questions also motivate further exploration of these bodies and simultaneously place constraints on how we can interact with them using exploration vehicles. More sobering, our ability to deflect hazardous small bodies, such as Near Earth Asteroids on Earth impacting trajectories, may be fundamentally controlled by these unknown properties. This talk will focus on the motivations for the exploration of asteroids, the constraints which this environment places on our interactions with them, and the implications of all this for our ability to mitigate them.

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