BOSTON UNIVERSITY

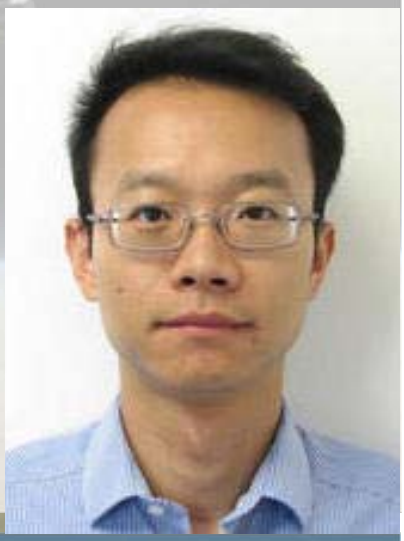
Boston University College of Arts & Sciences
Center for Space Physics

2018 - 2019 SPACE PHYSICS SEMINAR SERIES

Saturn's Magnetic Field Revealed by the Cassini Grand Finale

Magnetic fields are windows into planetary interiors. The existence and properties of the planetary magnetic fields reflect the interior structure, dynamics, and evolution of the host planets. Saturn's magnetic field continues to offer surprises since the first in-situ measurements made during the Pioneer 11 Saturn flyby. The Cassini mission entered the Grand Finale phase in April 2017, during which time the spacecraft dived through the gap between Saturn's atmosphere and the inner edge of the D-ring 22 times before descending into the deep atmosphere of Saturn on Sep. 15th 2017. The unprecedented proximity to Saturn (reaching ~ 2550 +/- 1290 km above the cloud deck) and the highly inclined nature of the Grand Finale orbits provided an ideal opportunity to decode Saturn's internal magnetic field and the electromagnetic environment between Saturn and its rings.

Here I will report the new features of Saturn's magnetic field revealed by the Cassini Grand Finale, including a newly discovered low-latitude inter-hemispherical field-aligned current (FAC) system, the directly determined northward offset of Saturn's magnetic equator and its "longitudinal" variations, small-scale yet highly consistent magnetic structures along the latitudinal direction. Implications on deep zonal flows (differential rotation) and stable stratification inside Saturn will be discussed. In closing, I will highlight the magnetic aspects of the ongoing Juno mission and a few upcoming planetary missions (e.g. Psyche mission to asteroid 16 Psyche, Clipper to Europa, BepiColombo to Mercury, JUICE to Ganymede, and a possible mission to Uranus/Neptune) and how they will help answer questions ranging from the thermal evolution history of asteroid 16 Psyche to the salinity of Europa's ocean.



Thursday, March 21st
4:00 - 5:00 p.m.
725 Commonwealth Avenue | Room 502

Hao Cao
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