

CIPS Planetary Lunch

Wednesday, May 7, 544 Campbell Hall, Noon - 1:00pm

"Aurora in the lumpy magnetic fields of Mars"

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Magnetometer observations demonstrate that it has been billions of years since Mars possessed a significant global dynamo magnetic field. As a result, the planet's extended atmosphere interacts directly with the solar wind, similar to the plasma interaction at Venus or comets. This interaction deposits energy in the Martian upper atmosphere that drives dynamics and chemistry and removes atmospheric particles, possibly contributing to substantial climate evolution. Interestingly, strongly magnetized regions of the crust substantially perturb the interaction on both local and global scales. The presence of crustal fields has many interesting consequences, including the creation of localized pockets of protected atmosphere, atmospheric 'escape hatches' for particle deposition and escape, and auroral emission near crustal fields.

I will give an overview of the interaction of the solar wind with the Martian atmosphere, including a discussion of three big picture science questions addressed by the study of this interaction. I will then discuss in more detail two examples of the effects of crustal fields: a complex, variable magnetic field topology more similar to the Sun than to any other solar system object, and the observations and consequences of auroral processes operating near Mars.