Space Physics Seminar

Thursday, February 9, 2017

Shedding Light on the Terrestrial Hydrogen Corona using its Ultraviolet Emission

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Knowledge of the spatial and kinetic distribution of the atomic hydrogen (H) population in earth's upper atmosphere is necessary both to understand its role as a dynamic buffer against the solar-driven environment of interplanetary space as well as to assess the rate of its permanent escape from earth's gravity and consequent long term atmospheric evolution. Reliable specification of these key parameters – whether analytically, numerically, or experimentally – is notoriously lacking, hindered mainly by the challenge of properly addressing the transition from efficient collisional thermalization of the H atoms in the lower thermosphere to the nearly collisionless, non-Maxwellian exospheric regime that extends beyond 20 earth radii. In this talk, I will describe recent advances in computational tools for modeling the radiative transport of optically thick geocoronal emissions which better represent the transition in H kinetics and enable the accurate interpretation of decades-worth of space-based remote sensing data for the first time. I will also present initial results from analysis of limb-scanning measurements of H emission at 121.6 nm (ultraviolet Lyman alpha) using the new technique. This work reveals surprising insights regarding the thermal structure of the upper atmosphere and also raises new questions about the coupling of the H geocorona to the thermosphere, ionosphere, and magnetosphere.

C·S·P

4:00pm in CAS 502. *Refreshments served at 3:45pm in CAS 500.*

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Next Week

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