Space Science Seminar
THURSDAY, 2017 July 6
10:30 a.m.
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Exploring Solar Coronal Properties Through Soft X-ray Observations of the MinXSS (Miniature X-ray Solar Spectrometer) CubeSat

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Host: Dr. Amy Winebarger

The Solar outer atmosphere, called the corona, is filled with hot plasma exceeding a million degrees kelvin confined by magnetic fields that radiates UV and X-rays. While there is a consensus that magnetic fields are vital conduits for transporting the energy needed to heat the corona from the lower solar atmosphere, the main heating mechanisms are still in debate. Photons originating from the strongest quasi-static magnetic field structures called active regions (ARs), contain information on the local plasma temperature, density, chemical abundance, and particle processes at the time of generation. Thus, soft X-rays provide unambiguous probes of hot plasma properties. The majority of solar soft X-ray observations have included spectrally integrated filter images, high spectral resolution ($E/\Delta E \sim 1{,}000$) narrowband spectra, low resolution ($E/\Delta E \sim 10$) spectral images, but limited spectrally-resolved broadband observations.

The Miniature X-ray Solar Spectrometer (MinXSS) 3U CubeSats developed by graduate students, professionals, and professors at the University of Colorado-Boulder are designed to fill the gap in soft X-ray measurements with moderate resolving power ($E/\Delta E \sim 40$, at 5.9 keV) over a fairly broad spectral bandpass (1 – 10 keV). The twin MinXSS CubeSats, mostly funded by NASA, can provide possibly 5 years of minimally interrupted observations of the solar soft X-ray flux to better constrain the characteristics and dynamics (especially solar flares) of coronal plasma. The MinXSS mission commenced on May 16, 2016 with the deployment of MinXSS-1 from the International Space Station and has been operating nominally. This talk will discuss the MinXSS mission, instrument capabilities, initial science results, and the benefit of combining MinXSS observations with other solar observatories.

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