Space Science Seminar
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X-ray Emissions from Magnetars

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Host: Dr. Adam Goldstein
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Magnetars represent the most extreme manifestation of the neutron star population. Their seconds-long rotational periods and large spindown rates imply surface dipole magnetic fields up to 1.0E15 G, the strongest ever measured in the Universe, and young spin-down ages of the order of 10,000 years. There are currently only 30 known magnetars, mainly in our own Galaxy. They are observed as bright and hot X-ray emitters with luminosity exceeding their rotational energy loss. Magnetars are the most variable sources in the neutron star zoo on time-scales ranging from milliseconds to years. On milliseconds to seconds time-scale, they show a unique and peculiar bursting behavior of hard X-ray/soft gamma-ray radiation with luminosity reaching upward of 1.0E47 erg/s/cm2. Following these bursting episodes, magnetars sometimes enter a period of enhanced high energy radiation where their X-ray luminosity increases by as many as 3 orders of magnitude compared to their quiescent persistent emission. In this talk, I will mainly focus on the bursting and persistent emission properties of magnetars, focusing on one of the brightest of them, 1RXS J170849.0-400910. I will discuss the uniqueness of this source and confront its properties to the current state-of the art theoretical models of radiative processes in high-B field regimes. Finally, I will discuss the advances in magnetar science seeded in an X-ray and soft gamma-ray mission with polarimetric capabilities.

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