

University of California, Davis
Physics Department
Cosmology Seminar



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“Physics of Extreme Magnetospheres”

Many astrophysical objects, including neutron stars and accretion disks, are commonly interpreted as strongly magnetized conducting bodies rotating in the presence of plasma. Our ability to model such magnetospheres has been hampered by the difficulty of solving for the self-consistent behavior of strongly magnetized relativistic plasmas. In this talk I will present a new numerical method for calculating the evolution of electromagnetic fields in the limit of force-free relativistic MHD, and will apply it to several sources of interest. First, I will present the time-dependent solution of the structure of pulsar magnetospheres in both aligned and oblique magnetic geometries. Then I will consider the magnetospheres of flaring magnetars and accretion disks. The method can be used for building intuition about various magnetic configurations as a first step to constructing astrophysical models of complicated sources.

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