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Building a Self-Consistent Magnetosphere Model KEITH MCELROY, PAUL ARENDT, New Mexico Tech — The magnetospheres of rotating magnetized astrophysical objects such as neutron stars and white dwarfs are still poorly understood, with basic tenets guiding their modeling often differing markedly between various authors. In this poster, we present preliminary results from a program designed to address this issue by assembling a rotating magnetosphere self-consistently, letting effects follow causes without preconception. A rotating reference frame is employed which has no singularities at the light cylinder, which allows us to correlate our results with pulsar profiles and to study the breakdown of corotation near the light cylinder. Charged particle trajectories are modeled using a simplified form of the dynamics applicable to strong magnetic fields, allowing us to define position-dependent effective EMFs on the stellar surface with minimal computation time. This quantifies each object's ability to act as a unipolar generator, and serves as a seed for magnetospheric currents in refinements to the model and as initial conditions for a future full MHD model.

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