Abstract Submitted
for the APR18 Meeting of
The American Physical Society

The Role of Tilted Magnetospheres During Black-Hole Binary Mergers ASHOK CHOUDHARY, West Virginia University , MARIA C. BABIUC, Marshall University, Huntington, ZACHARIAH B. ETIENNE, SEAN T. MCWILLIAMS, West Virginia University, Morgantown — The simultaneous detection of gravitational and electromagnetic waves from the binary neutron star merger GW170817 marked the beginning of multi-messenger gravitational-wave astronomy. Although the mechanisms involved in producing this electromagnetic counterpart are not entirely understood, the most promising explanations for the high energy emission involve the existence of a surrounding magnetic field. Massive black-hole binary mergers are also promising sources for coincident electromagnetic and gravitational wave observations. To better understand and predict these events, we study the time evolution of a black-hole binary system in an initially uniform magnetic field inclined at different angles to the orbital plane, using the recently released general relativistic force-free electrodynamics code, GiRaFFE. We present simulations of a single rotating Kerr black hole, a black-hole binary without spin, as well as work in progress to include a black-hole binary with spin, all immersed in a magnetosphere tilted at various angles with respect to the symmetry plane. We analyze the time evolution of the magnetic field and Poynting flux through a series of diagnostics, and determine the role of the tilt in the emission of electromagnetic radiation during the merger.

Ashok Choudhary
West Virginia Univ

Date submitted: 12 Jan 2018 Electronic form version 1.4