

APR17-2016-020064

the 8:30 am (first) time slot of my session, if possible. I will need to load several movie clips as well as my slides onto your server prior to my talk and practice how the system works. I may not be able to do this prior to the session.

Abstract for an Invited Paper
for the APR17 Meeting of
the American Physical Society

Hans A. Bethe Prize: Cosmic Collisions Online – Compact Binary Mergers, Gravitational Waves and Gamma-Ray Bursts¹
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Hans A. Bethe elucidated our understanding of the fundamental forces of Nature by exploring and explaining countless phenomena occurring in nuclear laboratories and in stars. With the dawn of gravitational wave astronomy we now can probe compact binary mergers – Nature’s cosmic collision experiments – to deepen our understanding, especially where strong-field gravitation is involved. In addition to gravitational waves, some mergers are likely to generate observable electromagnetic and/or neutrino radiation, heralding a new era of multimessenger astronomy. Robust numerical algorithms now allow us to simulate these events in full general relativity on supercomputers. We will describe some recent magnetohydrodynamic simulations that show how binary black hole-neutron star and neutron star-neutron star mergers can launch jets, lending support to the idea that such mergers could be the engines that power short gamma-ray bursts. We will also show how the magnetorotational collapse of very massive stars to spinning black holes immersed in magnetized accretion disks can launch jets as well, reinforcing the belief that such “collapsars” are the progenitors of long gamma-ray bursts. Computer-generated movies highlighting some of these simulations will be shown.

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