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Fast ejecta as a potential way to distinguish neutron stars from black holes in high-mass mergers ELIAS MOST, Princeton University, JENS PAPENFORT, SAMUEL TOOTLE, LUCIANO REZZOLLA, Goethe University Frankfurt am Main — Gravitational wave events involving very massive neutron stars, such as GW190425, have just started to be detected. Although typically classified as binary neutron star mergers, the observed gravitational-wave signal is usually not able to clearly establish a neutron-star nature of the massive primary object in the system. Thus, a black hole–neutron star system cannot be fully ruled out by the gravitational wave detection alone. In this talk, I will show how early fast ejecta – only produced in binary neutron star mergers – can potentially resolve this question and shed light on the nature of the binary system. By comparing simulations of binary neutron star and black hole – neutron star mergers of exactly the same masses and spins, I will show that such fast ejecta are entirely absent, if the primary is a black hole. Because our simulations indicate that the mass ejecta and accretion disks produced in the merger are comparable in both cases, the presence of fast ejecta might be the only distinguishing feature present in the electromagnetic afterglow accompanying such a gravitational wave event.

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