

When black holes collide

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Black hole pairs are promising contenders for a first direct detection by gravitational-wave observatories. With anticipation for a prolific observational future, we describe a multi-messenger portrait of black hole binaries that are both loud in gravitational waves and bright in electromagnetic waves. We describe a novel mechanism to generate electromagnetic luminosities powered by a black hole battery in an astrophysical circuit with a neutron-star magnet. Additionally in dense galactic nuclei, relativistic scattering leads to the formation of highly eccentric pairs that can produce uniquely loud gravitational bursts with potentially bright counterparts in electromagnetic bursts.