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Aneesur Rahman Prize for Computational Physics Talk: Black Hole Collisions

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The class of spacetimes describing the merger of two black holes contain some of the most fascinating solutions to the equations of general relativity. In this talk I will review what has been learnt about the binary black hole problem over the past several years from numerical simulations of the Einstein field equations, focusing on the more "extreme" solutions obtained in the high velocity limit. This is of possible relevance to LHC and cosmic ray physics in certain proposed large extra dimension scenarios. Some of the interesting results include the near-Planck scale luminosity in radiated gravitational waves, recoil velocities of on the order of ten thousand kilometers per second or larger, zoom-whirl orbital motion, the formation of near-extremal Kerr black holes, and that in the ultra relativistic limit the internal nature of the colliding object, whether black holes or not, seemingly becomes irrelevant.