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High Speed Black Hole and Soliton Collisions

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Abstract

The ultra-relativistic regime of black hole mergers is still a largely unexplored area in classical general relativity. I will explain why this might be an interesting realm to study, both from a purely theoretical perspective, and because some more recently proposed models of extra dimensions suggest black holes might be created at the LHC (Large Hadron Collider) and in high-energy cosmic ray collisions with the earth. These models postulate a Planck scale in the TeV range, and the assumption is that the interaction in sufficiently super-Planck-energy particle collisions is dominated by classical gravity, which necessarily leads to black hole formation. I will review the speculations regarding this latter statement, and suggest it may not be a foregone conclusion. I will present some early results from numerical solutions of both high-speed black hole and soliton collisions trying to better understand this aspect of gravity.