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Monte Carlo methods for stationary solutions of general-relativistic Vlasov systems: Planar accretion onto a moving Schwarzschild black hole

Monday 22 July 2024 17:30 (15 minutes)

I will present the results of a Monte Carlo simulation of a planar accretion of the relativistic Vlasov gas onto a moving Schwarzschild black hole. The gas is assumed to be in thermal equilibrium at infinity, where it obeys the Maxwell-Jüttner distribution. Monte Carlo results consistently confirm the analytically derived exact expressions for particle current density in all examined cases. This simulation methodology builds on the approach developed last year for a stationary Schwarzschild black hole: Phys. Rev. D 108, 124057 (2023). I will elucidate the modifications necessary for setting up the simulation for the complexities introduced by black hole motion. This presentation is a follow-up to Patryk Mach's talk, which covers the theoretical foundations of the Monte Carlo method.

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