

Preliminary Studies on Black Holes

The investigation of black holes (BHs) and their properties is a subject exerting considerable attraction among those interested in the universe and its astrophysical content. This context motivated the studies conducted by the authors on black hole physics. Their methodology included a bibliographic review of papers and books addressing the theme pedagogically. We start with a historical introduction that highlights the importance of these fascinating objects, we proceed to establish the physical concepts underlying BHs, we qualitatively explore some topics in Einstein's theories of Special Relativity and General Relativity. In particular, we write down the Minkowski metric and Schwarzschild metric, and begin the journey of characterizing them qualitatively (e.g. through understanding their causal structure). The Schwarzschild metric is fundamental to understanding the so-called Schwarzschild BH, a spherical and static object that models the outer region of a massive star that has extinguished its nuclear fuel and collapsed under its own gravity (or curvature). We will present a summary of these preliminary Scientific Initiation studies in our poster.

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