

[online] Static black hole surrounded by dark matter and cloud of strings

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We investigate a Schwarzschild-like black hole embedded in a combined environment consisting of a Dehnen-type dark matter halo and a cloud of strings. We first construct the corresponding composite spacetime metric and examine its geometric properties, including the horizon structure, curvature invariants, and the validity of the classical energy conditions. Subsequently, we explore the geodesic dynamics of test particles by analyzing the effective potential, circular orbits, and the innermost stable circular orbit (ISCO). We also study the optical appearance of the black hole by computing its shadow and assessing how the surrounding dark sector components modify its observable features. Our results elucidate the influence of dark matter distributions and string clouds on black hole geometry and dynamics, highlighting characteristic signatures that could serve as potential observational probes with current and future astrophysical facilities.

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