NONMINIMALLY COUPLED SCALAR FIELD IN SCHWARZSCHILD–DE SITTER SPACETIME: GEODESIC SYNCHROTRON RADIATION

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We investigate the scalar radiation produced by a source interacting with a nonminimally coupled scalar field in four-dimensional Schwarzschild–de Sitter spacetime. Using quantum field theory in curved spacetimes, we calculate the emission amplitude at tree level. We find that the source emits synchrotron-like radiation for orbits near the photon sphere across all permissible parameter values. Additionally, we observe that the emitted power is significantly influenced by the coupling to the curvature scalar. Notably, the previously noted enhancement in the contribution of lower multipoles to the emitted power with minimal coupling is absent when conformal coupling is considered.