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Landau-Lifshitz and Weinberg energy-momentum complexes for a f(R)-modified gravity black hole solution with electric and magnetic charges

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The problem of energy-momentum localization for a four-dimensional, spherically symmetric, electrically as well as magnetically charged black hole solution in a $f(R)$-type modified gravity with $(R) = R+2\beta\sqrt{R-8\Lambda}$ is studied. Asymptotically this solution behaves as an AdS or dS space-time, while it transforms to the Reissner-Nordstr\"{o}m solution in the case of zero magnetic charge. The energy and momentum distributions are computed by utilizing the Landau-Lifshitz and the Weinberg energy-momentum complexes. In both prescriptions all the momenta vanish, while the energy is found to depend on the electric and the magnetic charge, the mass m, the dimensional metric parameter β, the cosmological constant Λ, and the radial coordinate r. The behavior of the energy is examined near the origin and near infinity, while the special case of zero electric charge is also considered. Furthermore, some investigations of a possible astrophysical interest are performed.

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