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Foliation dependence of black hole apparent horizons in spherical symmetry

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Numerical studies of gravitational collapse to black holes used to predict gravitational waves make use of apparent horizons, which are intrinsically foliation-dependent. We discuss possible solutions to this problem using the Hawking-Hayward quasilocal mass. In spherical symmetry, a sensible approach consists of restricting to spherical spacetime slicings. Then the apparent horizons enjoy a restricted gauge independence but thermodynamical quantities associated with them are fully gauge-dependent. The widely used comoving and Kodama foliations are of particular interest and are discussed explicitly.
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