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Black Hole Dissolution via External Fields

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We know of two ways in which a black hole can end. The first is by black hole evaporation via the emission of Hawking radiation. This is an extremely slow process by which a solar mass black hole expected to take on the order of 10^{67} years to evaporate. We dub the second method black hole dissolution and, in contrast, this is a fast process whose early stages are the gravitational wave signatures of black hole mergers that have been observed hundreds of times by LIGO-VIRGO-KAGRA. During a black merger, two black holes become one. While the final stages are hidden by the common event horizon, inside that final black hole the two original black holes encounter intense gravitational fields comparable to those binding themselves and they ultimately dissolve in this region of strong spacetime curvature and lose their individual identities.

In this talk, I will present recent some recent results in which a similar dissolution can be studied in exact Weyl solutions which describe black holes that are distorted by strong external fields. This distortion may be tuned beyond the point at which their apparent horizons (feel free to read apparent in either a technical or general sense!) are no longer boundaries between trapped and untrapped regions.

Keyword-1

black hole

Keyword-2

black hole horizons

Keyword-3

black hole mergers

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