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A master equation for gravitational wave memory

A permanent offset caused by the passage of gravitational waves, known as the memory effect, is under active research in both theoretical and observational aspects of gravitational physics. Due to its relation to asymptotic symmetries and soft theorems, the memory effect has received considerable attention for asymptotically flat spacetimes in general relativity (GR). As a result, the memory effect can only be effectively achieved for a limited class of geometries. We use the covariant approach of splitting the GR field equations into 1+1+2 form to generalize this for a larger class of spacetimes. We show that the covariant approach allows us to obtain a master equation that describes gravitational wave memory in a more general class of spacetimes. A brief overview of the covariant 1+1+2 formalism, the ensuing calculations, and some examples of spacetime geometries in which this approach has been applied will be presented in this talk.

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