

Perturbations of hypersurfaces of arbitrary causal character

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In this talk we study the problem of perturbations of spacetimes containing a hypersurface which is allowed to change perturbatively. I will briefly review the geometry of general hypersurfaces in a spacetime [1] (i.e. with arbitrary causal character at each point) and introduce a framework suitable for the study of their deformations in perturbation theory. This was formulated originally by M. Mars to second order [2], but it was restricted to everywhere timelike or spacelike hypersurfaces.

I will discuss a generalisation of the method that allows for perturbations of general hypersurfaces to first order [3], and provide examples involving null hypersurfaces in Schwarzschild and Vaidya spacetimes, and timelike hypersurfaces in the context of rotating stars or tidal effects [4].

References

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