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Towards the gravitational wave phase of compact binaries with 4PN precision

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The precise knowledge of the gravitational phase of compact binaries is crucial to the detection methods for gravitational waves. To this days, we know it analytically (for non-spinning systems) up to the 3.5 post-Newtonian (PN) order, ie. up to the (v/c)^7 correction beyond the leading order. If this precision is sufficient for the data analysis of the current generation of detectors, the next one (notably LISA) will require at least a 4.5PN accuracy.

An essential ingredient to compute the gravitational wave phase is the mass quadrupole moment, that we are currently computing for compact binaries at 4PN order, using a post-Newtonian-multipolar-post-Minkowskian matching algorithm. This method involves challenging technical issues, due to the appearance of non-physical divergences, that have to be properly regularized, as well as non-linear interaction terms (dubbed "tails"). In this talk, I will present the current status of the computation, and review the steps that are left in order to fully derive the gravitational phase at 4PN order.

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Je participerai seulement en ligne

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