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Outlook for the detection of higher gravitational wave memory effects

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Gravitational wave memory is a non-oscillatory feature of gravitational wave signals which both probes nonlinearities appearing in Einstein's equations and is connected to the asymptotic structure of isolated gravitating systems. In recent years, in addition to the usual "displacement" memory, which appears as a DC offset in the gravitational wave signal, other "higher" memory effects have been proposed, such as the spin and center-of-mass memories. While none of these effects are large enough to be confidently observed in single events with current ground-based detectors, evidence for these effects can be inferred in a population by combining data from multiple events. In this talk, we will review past forecasts of the detectability of displacement and spin memories, which were expected to be dominant, as well as discuss the detectability of the center-of-mass memory and two other higher memory effects.

Authors: GRANT, Alexander (University of Southampton); NICHOLS, David (University of Virginia); SIDDHANT, Siddhant (University of Virginia)

Presenter: GRANT, Alexander (University of Southampton)

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