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# A neoclassical approach to coherent gravitational-wave search

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The low instantaneous signal-to-noise ratio for most classes of gravitational-wave source necessitates the use of coherent search, which looks for signals in some length of data through phase comparisons against modeled templates. Such comparisons are statistics of the data, defined as functions on the model space. Coherent statistics suffer from uncontrolled variations over the space, which result from non-local signal correlations as well as the manifestation of detector noise. These variations severely hinder search algorithms when the model space itself has large volume and high complexity, as in the case of certain source classes for the next generation of gravitational-wave detectors.

Traditional approaches in gravitational-wave data analysis address the difficulties of coherent search by defining statistics that are "smoother" in some way; these generally involve either maximizing the original statistic over some degrees of freedom, or annealing it through simple rescaling. In this talk, I advocate for a third alternative - the exponential suppression of variations - and introduce a realization of this strategy for extreme-mass-ratio-inspiral searches.

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