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Enhancing un-modeled gravitational wave searches sensitivity with Wavegraph

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The first direct detection of gravitational waves (GW) showed that un-modeled search pipelines can reliably detect "heavy" binary black holes (BBH). Un-modeled searches such as Coherent WaveBurst (cWB) make minimal assumptions on the target signal. Operationally this implies that those search algorithms do not impose constraints on the clusters of significant time-frequency coefficients extracted from the observation data. We propose an alternative clustering scheme named Wavegraph dedicated to cWB that instead restrict the search to a priori astrophysically motivated clusters. We present the basic principles of Wavegraph and we show using colored simulated Gaussian noise and playground detector data whether this method extends the search capabilities in the BBH case.

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