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PySTAMPAS - a long transient GW pipeline

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Long transient gravitational waves refer to a class of signals with duration in the range of 1-1000s, which could be emited by a wide range of astrophysical processes such as accretion disk instabilities around black holes or deformations in magnetars. As these processes are still poorly modelized, searches for such kind of signals mostly rely on unconstrained detection methods that make few or no assumptions on the signal morphology.

PySTAMPAS is a new data analysis pipeline designed to search for long transient GW signals in ground-based interferometers data. This python-based pipeline relies on the STAMP detection method, which consists in identifying excess of power in cross-correlated ft-maps. It implements several new features that are intended to increase the detection sensitivity and to reduce the computational cost of background studies. Preliminary results obtained on both Monte-Carlo data and real data from the O2 run show an increase in sensitivity between 30% and 100%, while the reduced computational cost allows to simulate enough background noise to reach 5-sigma detection sensitivity. The pipeline can be used to perform a comprehensive, all-sky search for long-duration GW events over a whole observing run as well as targeted searches around specific promising events such as Gamma-Ray Bursts or binary neutron stars coalescence.

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