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Improving future searches for gravitational wave transients on multi-detector data

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When it comes to gravitational wave signals, both waveform reconstruction and sky localization benefit from as broad a detector network as possible. And yet, in several instances the contribution of the Virgo detector has not been fully exploited, because the advantages are offset by the overall increase of background noise. This is especially concerning for multi-messenger events, and it motivates our investigations aimed at enhancing the multi-detector performance of "coherent WaveBurst" (cWB), a pipeline routinely used to detect short gravitational-wave transients with a mimimally-modeled method that exploits the coherence of the signals in the detector network.
In this contribution, I discuss the improvements achieved through the implementation of a decision tree algorithm to upgrade the ranking procedure of gravitational wave bursts (GWBs) in cWB in preparation to the upcoming observing run of the LIGO-Virgo-KAGRA collaboration. In particular, I consider the case of the three-detector LIGO-Virgo network and I discuss the robustness of the results across widely different GWB morphologies.

Primary author: BINI, Sophie (Istituto Nazionale di Fisica Nucleare)

Co-authors: SALEMI, Francesco (INFN); SZCZEPANCZYK, Marek (University of Florida); MISHRA, Tanmaya (University of Florida); GAYATHRI, V. (University of Florida); VEDOVATO, Gabriele (PD); PRODI, Giovanni Andrea (TIFP); MIANI, Andrea (Istituto Nazionale di Fisica Nucleare); LAZZARO, Claudia (Istituto Nazionale di Fisica Nucleare); DRAGO, Marco (Istituto Nazionale di Fisica Nucleare); TROVATO, Agata (INFN - LNS); MILOTTI, Edoardo (Istituto Nazionale di Fisica Nucleare); VIRTUOSO, Andrea (Istituto Nazionale di Fisica Nucleare); TIWARI, Shubhanshu (Physik-Institut, University of Zurich); KLIMENKO, Sergey (University of Florida)

Presenter: BINI, Sophie (Istituto Nazionale di Fisica Nucleare)

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