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VIRGO and Gravitational Waves computing in Europe

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VIRGO is an interferometer for the detection of Gravitational Waves at the European Gravitational Observatory in Italy. Along with the two LIGO interferometers in the US, VIRGO is being used to collect data from astrophysical sources such as compact binary coalescences, and is currently running its third observational period, collecting gravitational wave events at a rate of more than one per week.

Data from the interferometer are processed by running search pipelines for a number of expected signals, from coalescing compact binaries to continuous waves and burst events. Furthermore, detector characterisation studies are run. Some of the processing needs to be done with low latency, in order to be able to provide triggers for other observatories and make multi-messenger observations possible. Deep searches are run offline on external computing centres. Thus, data needs also to be reliably and promptly distributed from the EGO site to computer centres in Europe and the US for further analysis and archival storage.

Two of the defining characteristics of VIRGO computing are the heterogeneity of the activities and the need to interoperate with LIGO. A very wide array of analysis pipelines differing in scientific target, implementation details and running environment assumptions have to be allowed to run ubiquitously and uniformly on dedicated resources and, in perspective, on heterogeneous infrastructures.

The current status, possible strategies and outlook are discussed.

Consider for promotion

Yes

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