

A convoluted neural network implementation for the search for compact binary signals at Virgo

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Abstract

The detection of Gravitational Waves by LIGO and Virgo in the last few years represented the beginning of a new era in the understanding of the universe. The new observation periods foreseen in 2019, 2021 and 2024, with gradually increasing sensitivities, promise to bring new breakthroughs. In this contribution, we explore the feasibility of a deep-learning implementation for the search for gravitational waves from compact binaries at Virgo. Supervised techniques based on convoluted neural networks, acting on processed images, are employed in order to extract previously injected signal templates in the O2 data. A variety of signal parameters are considered and the results are expressed in terms of an extended reach for binary detection, as well as an improved signal-to-noise ratio as a function of the binary mass and luminosity distance.