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Generative models for transient noise studies in Gravitational Waves detectors

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Non-Gaussian transient noise artifacts, commonly referred to as glitches, are one of the most challenging limitations in the study of gravitational-wave interferometer data due to their similarities with astrophysical sources signals in the time and frequency domains. Therefore, exploring novel methods to recover physical information from data corrupted by glitches is essential. In our work, we focus on modeling and generating glitches using deep generative algorithms. Namely, we employ a Pix2Pix-like architecture, a family of Generative Adversarial Networks for data-to-data translation. This strategy involves mapping glitches from carefully chosen auxiliary channels (uncorrelated with the physical signals) to the ‘strain’ (main) channel, allowing us to subtract the generated noise from the physically interesting data. In this talk, we outline our method and present some preliminary results.

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