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## **(G\*) A Non-linear Chirp Transform Method for Gravitational Wave Detector Glitch Signal Classification**

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Signals with varying frequencies manifest across numerous disciplines within physics, astrophysics, and various other fields. One prevalent example is the occurrence of chirp-like glitches in gravitational wave detector data, which can occasionally trigger false alarms in binary merger waveform detection pipelines. In this study, we propose a novel chirp transform method featuring a waveform model characterized by nonlinearly changing frequencies. We outline both the analytical and discrete representations of this non-linear chirp transform. To enhance efficiency, we implement approximations and mathematical manipulations to allow for the flexible adjustment of transformation parameters such as window sizes and chirp rates. Additionally, we leverage the efficiency of the Fast Fourier Transform algorithm for numerical computations.

Our approach is tailored to identify and classify glitch signals that bear similarity to binary merger gravitational wave signatures. By harnessing the power of the chirp transform technique, we facilitate the comprehensive classification and analysis of detector glitch signals across multiple domains, including time, frequency, and chirp rate.

### **Keyword-1**

Chirp Transform

### **Keyword-2**

Gravitational Waves

### **Keyword-3**

Fourier Transform

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