Detecting Highly-Eccentric Binaries with a Gravitational Wave Burst Search

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This is an abstract. Hightly eccentric binaries produce distinct bursts at pericenter crossing. Connect individual bursts with a prior on their time and frequency content.

I. INTRODUCTION

Gravitational waves We are now post GW150914 [1]. There are lots of binary black hole (BBH) detections.

Binaries are thought to circularize before entering LIGO band [citation needed]. Rodriguez et al. says fraction of BBH will have $e \gtrsim 0.1$ when they enter band [citation needed]. Highly eccentric: dynamical capture, N-body.

Eccentric waveform modeling is hard. See recent work from Yunes group, Hinder+ 2018, Yang+ 2018... [citation needed]So templated searches are hard. Existing searches with eccentric templates.

Burst searches! BayesWave [2]. Targeted bursts: chirplets, cWB's BBH search [citation needed]. cWB's eccentric method [citation needed].

II. WAVEFORM MODEL

Our model is built from the *Newtonian Burst Model* defined in section 2.1 of Loutrel and Yunes [3].

The waveform is wavelets. In order to associate disconnected wavelets we use prior.

The prior is a function of physical meta-parameters that discribe the binary orbit.

III. RECOVERY OF SIGNALS

IV. DISCUSSION

[1] B. P. Abbott, R. Abbott, T. D. Abbott, M. R. Abernathy, F. Acernese, K. Ackley, C. Adams, T. Adams, P. Addesso, R. X. Adhikari, and et al., Physical Review Letters **116**, 061102 (2016), arXiv:1602.03837 [gr-qc].

[2] N. J. Cornish and T. B. Littenberg, Classical and Quantum Gravity **32**, 135012 (2015).

[3] N. Loutrel and N. Yunes, Classical and Quantum Gravity **34**, 135011 (2017).

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