DY11131/Brown – Summary of changes to the manuscript

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We summarize the changes that have been made to the manuscript, in response to the referee's comments and suggestions. We would like to the thank the referee for carefully reading through the manuscript and their constructive suggestions.

Major Changes:

1. We have added the analysis for the loss in detection volume/observation rate, as is implied by our fitting factor results. The fitting-factors give an estimate of the fractional loss in the SNR, for binaries in different configurations. The loss is observed to be higher for binaries that are oriented sub-optimally to the detector, and hence their relatively larger fractional loss in SNR contributes proportionately lesser to the over-all observable volume available to the detector. We estimate the loss in the volume observable by the detector (at a fixed SNR threshold) using volume weighted fitting-factors, and this has been described in detail at the beginning of Sec. III and results summarized in Sec. IIIC. For a population of binaries distributed uniformly in spacial volume, this corresponds to the loss in detection rate for Advanced LIGO. Also, Fig. (7) has been added with this quantity plotted on the component-mass plane and the mass-ratio-inclination-angle plane, while marginalizing over the other parameters respectively.

2. We have added Fig. (6) showing the loss in fitting-factors on the mass-ratio- inclination-angle plane, and the inclination-angle-total-mass plane. These figures show the orientations of the binary which suffer from the highest SNR loss because of ignoring the higher-order modes in search templates. The description has also been added in Sec. IIIC.

3. We have added Fig. (4) showing the minimal-fitting-factor (minimal-match) of the TaylorF2 bank, in the region restricted to systems with total masses below different threshold values. We have also simulated 100,000 more points to estimate the effectualness of the TaylorF2 bank more precisely, where we had 25,000 points earlier. We observe that the region where the TaylorF2 bank is effectual is the one bounded by the total mass threshold of ~ 11.4 solar masses. This threshold supercedes the one stated in our earlier manuscript. The description has been added to Sec. IIIB.

4. Similar to (3.) above, we have added Fig. (5) (right panel), showing the minimal match of a MM= 0.97 bank with $l = m = 2$ EOB multipoles as templates, in regions restricted to having mass-ratios below different thresholds. We find that this bank is effectual for systems with mass-ratios $\lesssim 1.68\,(4)$, corresponding to the acceptable loss in detection rate (at a fixed SNR threshold) being $10\%\,(15\%)$. The description has been added to Sec. IIIC.

5. The Abstract, Introduction and the Conclusions sections have been updated with the results described in (1.) - (4.) above.

Minor Changes:

1. We have changed Fig. (3) and Fig. (5) (left panel) from scatter plots to contour plots, showing the drop in fitting-factors in a more contrasted color scheme. This has been done in hope that these plots are better readable.

2. We have added a description of the calculation of the initial conditions to generate an EOBNRv2 waveform, at the end of Sec. IIA.

3. We have added a discussion of the bank placement metric, which we use to construct different template bank grids, as Sec. IIB.

4. Some of the description of mathematical quantities has been moved from the beginning of Sec. III to Sec. IIB, where we need those to discuss the bank placement metric.

5. We have added a description of volume-weighted fitting-factors at the beginning of Sec. III as well. We use this quantity to quantify the loss in event observation rate for the detector, as a function of a few parameters of the binary system, while marginalizing over the others.

6. We have acknowledged the anonymous referee for their positive feedback.