

Birmingham Institute for Gravitational Wave Astronomy  
School of Physics and Astronomy  
University of Birmingham  
Birmingham  
B15 2TT  
United Kingdom  
w.farr@bham.ac.uk

July 19, 2017

Dr. Leslie Sage  
968 National Press Building  
529 14th Street NW  
Washington DC 20045-1938  
United States

Dear Dr. Sage:

Please find enclosed a submission to be considered for a Nature Letter. We think these results are particularly exciting because they are the first time the spin measurements in the existing three likely gravitational wave events (GW150914, LVT151012, and GW151226) are analysed together to constrain the formation scenario of the observed population of merging binary black holes, a long-standing problem in gravitational wave astronomy. Additionally, the paper explains the origin of and corrects a misconception in the existing literature (particularly the Vitale, et. al (2017) paper referenced in our submission) that  $\mathcal{O}(100)$  detections will be required to distinguish between different formation scenario in these objects. [Note (added 19 July 2017): this statement does not accurately reflect the relationship between Vitale, et al. (2017) and the current paper. See text.]

Our submission has been formatted using the AASTeX LaTeX package. We estimate that the main body of the text, excluding the abstract, is  $\sim 1600$  words long, with four figures, each single-panel, and is therefore within or very close to the Nature Letter limit. The abstract is  $\sim 240$  words long (not counting references, which are “Harvard style” in the AASTeX package). The document contains five sections in an Appendix that we would like to be supplemental information to the Letter.

Sincerely,

Will M. Farr