



Contribution ID: 370

Type: **not specified**

## Tentative evidence for echoes from GW190521

*Wednesday, 25 August 2021 23:15 (20 minutes)*

GW190521 in a class of its own is a different signal, being the most massive BBH event observed to date. The exceptionally dominant ringdown of this event and its large mass makes it a plausible candidate to search for GW echoes. In this letter we perform an unprecedented search in two different platforms, satisfying a physical template (matched filtering and MCMC with PyCBC) and model agnostic search (Coherent WaveBurst-cWB). We expect the existence of post-merger horizon mode frequencies  $m \times \Omega_H$  (with  $m=2$  for quadrupolar gravitational radiation) as a consequence of BBH merger non-linear dynamics and Planck scale Boltzmann reflection near the would be event horizon. In this search, with a careful bayesian inference approach using dynamic nested sampling MCMC algorithm, we found  $\ln \mathcal{B}_{\text{IMR}}^{\text{IMRE}} = +2.0$  evidence for such frequencies and their echoes in GW190521. On the other hand, the results obtained via cWB supports that main event and the echo are preferably co-localized,  $\mathcal{B}_{\text{nonco-loc}}^{\text{co-loc}} \approx 7.1$ . Additionally, accounting for all the “look-elsewhere” effects, we find tentative evidence for GW echoes at false detection probability of  $2.5 \times 10^{-3}$ , using cWB pipeline.

**Primary author:** ABEDI, Jahed (University of Stavanger)

**Co-authors:** F. LONGO, Luís; AFSHORDI, Niayesh

**Presenter:** ABEDI, Jahed (University of Stavanger)

**Session Classification:** Gravitational Waves as Probes for New Physics

**Track Classification:** Gravitational Waves as Probes for New Physics