ET OSB Division 8 - Waveforms
XIII ET Symposium

Coordinators:
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OSB Div 8: Organisation

Coordinators:

- Laura Bernard (Observatoire de Paris) laura.bernard@obspm.fr
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- Patricia Schmidt (University of Birmingham) p.schmidt@bham.ac.uk

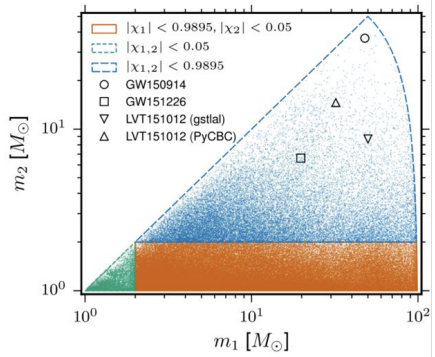
Waveforms Mailing list: et-osb-waveforms@ego-gw.it

Waveforms ET Wiki: https://wiki.et-gw.eu/OSB/Waveforms/WebHome

Monthly meetings - come join us

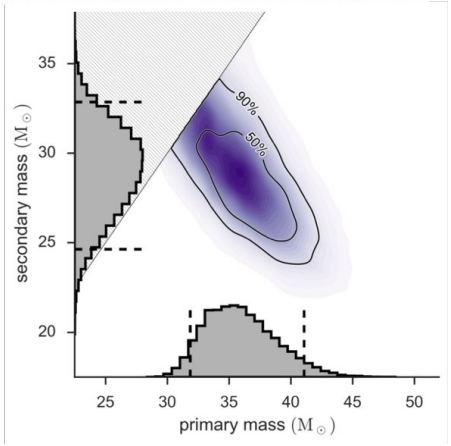
Waveform models essential ingredient to GW astronomy

Detection by matched filtering



LIGO+Virgo, PRX 2016 (1606.04856)

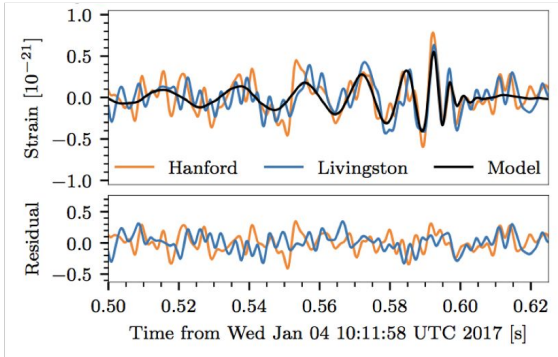
Parameter estimation



"GW150914" Abbott+ PRL 12016

Populations

Testing GR

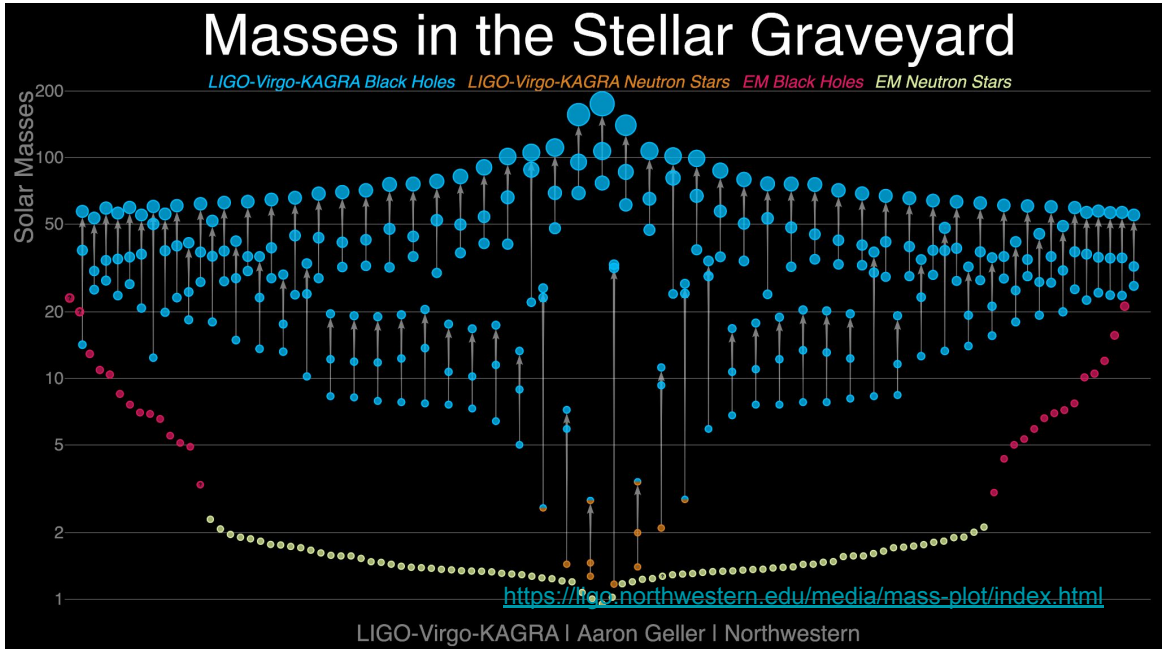


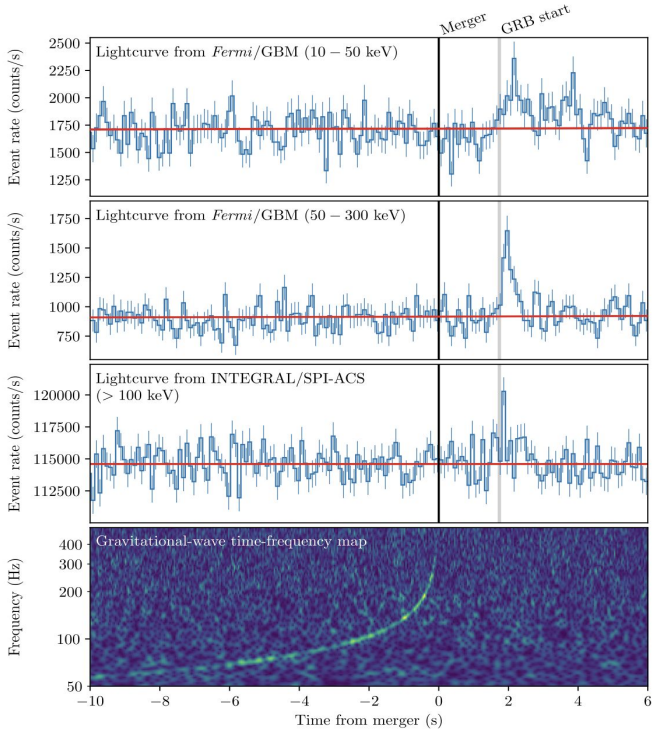
LIGO+Virgo, PRL 2017 (1706.01812)

Goal of Div-8: Facilitate and foster research towards waveform models that enable all ET science goals.

Waveform models in today's GW detectors

- GW astronomy strikingly successful
- Waveform models supported these successes





Astrophys. J. Lett. **848**, L13 (2017)

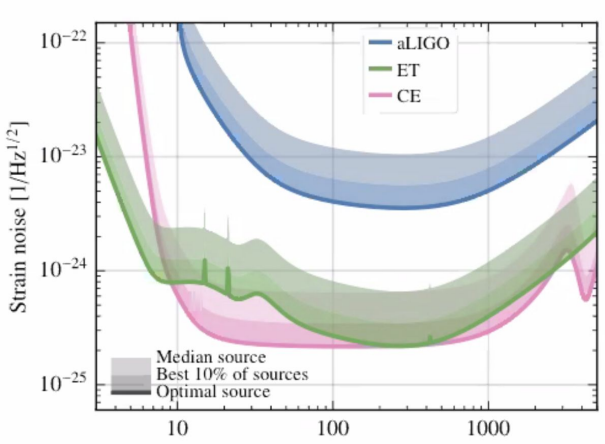
Einstein Telescope: Science Potential = Challenges

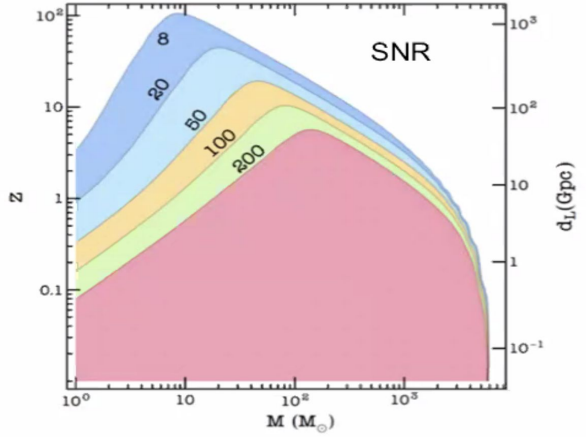
Higher SNR
- more accurate waveforms needed to avoid PE biases and impact on astro & TGR conclusions
- more physical effects visible (EOS, QNMs, eccentricity …)

Orders of magnitude more events
- wider parameter space coverage

Broader detector bandwidth
- New cross-frequency physics (BNS inspiral + post-merger)
- each signal in band for many more GW cycles
- preserve accuracy & fast evaluation

Exploitation of ET science requires significant upgrades of all aspects of waveform models



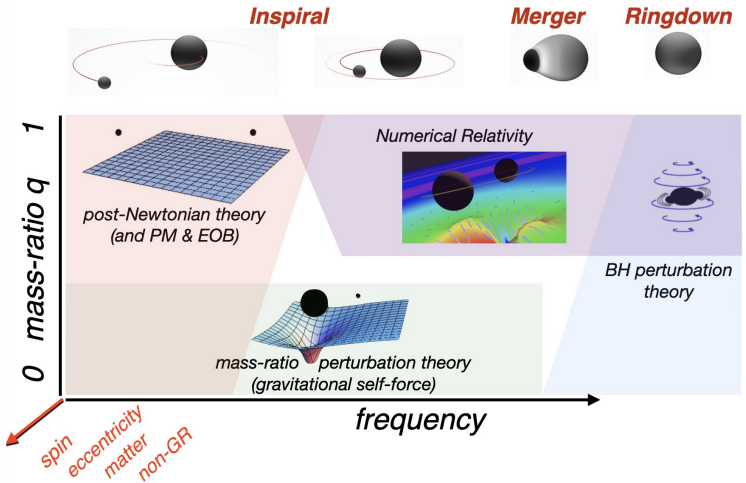


OSB Div 8: Focus

Assessment of waveform systematics & accuracy requirements for 3G

Waveform development for compact binaries in GR and beyond GR theories, vacuum & matter incl. exotic matter, and non-binary sources

Development of new waveform acceleration techniques to aid 3G GW data analysis



More details in the blue book:
https://www.overleaf.com/read/vgskyhctxqwx

OSB Div 8: Today's Speakers

Dr Antoni Ramos-Buades (AEI) on the current status and challenges of Numerical Relativity simulations of binary black holes

Dr Maria Haney (NIKHEF) on the status of the IMR waveform modeling, with some examples of recent progress and open challenges towards the needs for 3G detectors