A ⚡introduction to source property inference of gravitational waves

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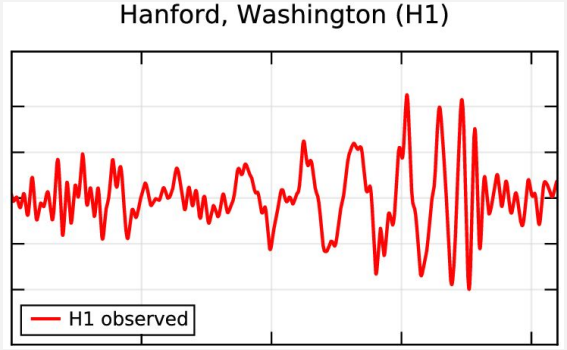
⚡Talk at Statstro
14th May 2025

We should care about gravitational wave source properties



Abbott+ 2016, arXiv:1602.03837, arXiv:1602.03840

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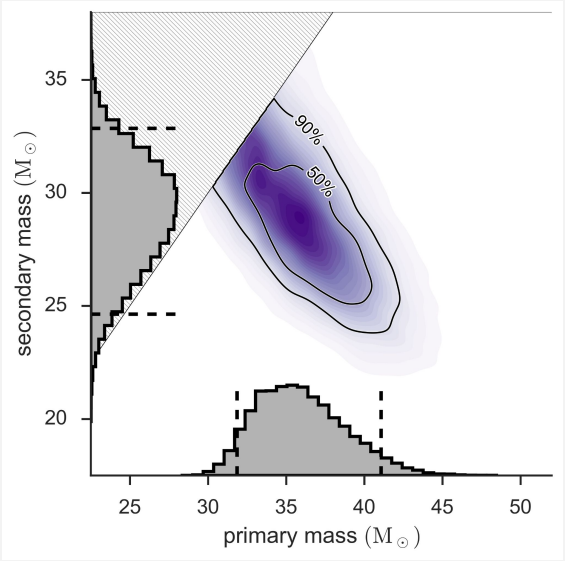


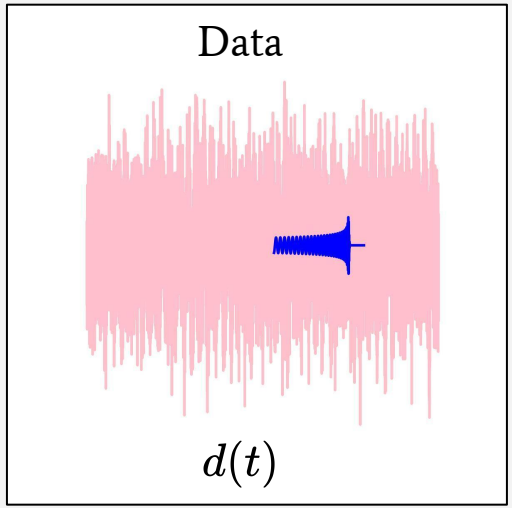
Understand physics and astrophysics of massive stars and compact stars

Perform tests of general relativity

Measure the expansion rate of the Universe

...and much more!

Ingredients of GW source property inference



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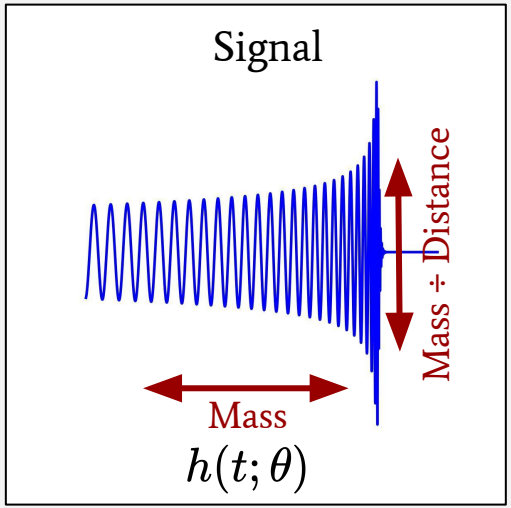

Predicted by general relativity

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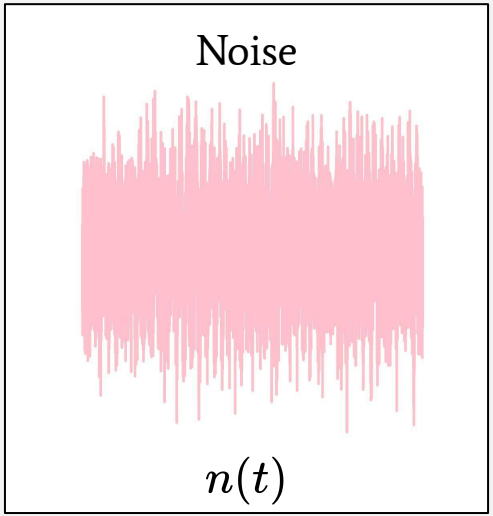

Calculated from stretches with no signals

$$p(\theta|d) = \frac{p(d|\theta)p(\theta)}{Z}$$

⟸ Typically work with the Fourier transform of these quantities

Bilby—solving all your gravitational-wave inference needs and then some!

https://github.com/bilby-dev/bilby
https://bilby-dev.github.io/bilby/

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