Reed Essick

reed.essick@gmail.com
+1(630)292-9088

BS Mech. Engineering	WUSTL	2007-2011
PhD Physics	MIT	2011-2017
Postdoctoral Fellow	KICP, Univ. of Chicago	2017-2020

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Transient Gravitational-Wave Astrophysics

Data Quality
- Essick+ CQG **30** 15 (2013)
- Biswas+ PRD **88** 062003 (2013)
- Essick+ arXiv:2005.12761 (2020)

Detection
- Lynch+ PRD **95** 104046 (2017)

Localization
- Essick+ ApJ **800** 2 (2015)
- Becsy+ ApJ **839** 1 (2017)
- Vitale+ MNRAS Lett. **466** 1 (2017)

Calibration
- Essick+Holz CQG **36** 12 (2019)

3G detectors
- Essick+ PRD **96** 084004 (2017)

More general Parameter Estimation

Nonlinear Tides
- Essick+ PRD 94 103012 (2016)
- Abbott+ PRL 122 061104 (2019)

Equation of State Constraints
- Landry+Essick PRD **99** 084049 (2019)
- Essick+ PRD **101** 063007 (2020)
- Landry+ PRD **101** 123007 (2020)
- Essick+ arXiv:2004.07744 (2020)

Population inference
- Fishbach+ ApJ Lett. **899** 1 (2020)
- Essick+Landry arXiv:2007.01372 (2020)

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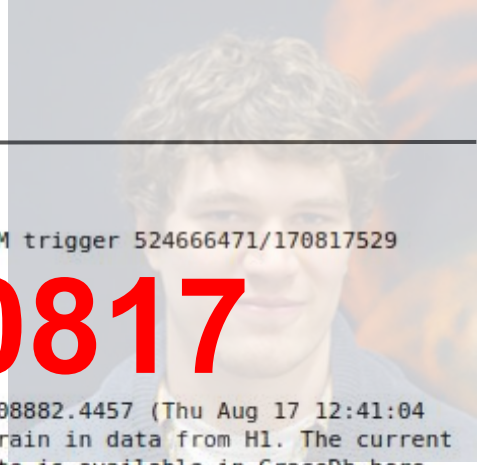

TITLE: GCN CIRCULAR
NUMBER: 21509
SUBJECT: LIGO/Virgo G298048: Identification of a binary neutron star candidate coincident with Fermi GBM trigger 524666471/170817529
DATE: 17/08/17 14:09:25 GMT
FROM: Reed Clasey Essick at MIT <ressick@mit.edu>

GW170817

The LIGO Scientific Collaboration and the Virgo Collaboration report:

A binary neutron star candidate was identified in data from the LIGO Hanford detector at gps time 1187008882.4457 (Thu Aug 17 12:41:04 GMT 2017). The signal is clearly visible in time-frequency representations of the gravitational-wave strain in data from H1. The current significance estimate of ~1/10,000 years is based on data from H1 alone. Information about this candidate is available in GraceDb here

https://gracedb.ligo.org/events/view/G298048

The effective distance to this candidate is approximately 58 Mpc and the current localization estimate using gravitational-wave data alone is quite broad because it only makes use of data from H1. We note that this is only an estimate of the effective distance, and the actual luminosity distance to the source is likely larger.

The neutron star coalescence candidate is also clearly visible in data from the LIGO Livingston detector, although there is a coincident noise artifact in the L1 data. To be clear, the binary neutron star candidate is clearly visible in the L1 data on top of the noise artifact. There is no evidence for any noise artifact at H1. Virgo was online at the time, although its data was not used to estimate the candidate's significance. It is expected to be visible in all detectors once the data has been analyzed.

The gravitational-wave candidate was found in coincidence with Fermi GBM trigger 524666471/170817529, which occurred at gps time 1187008884.47 (Thu Aug 17 12:41:06 GMT 2017). This is approximately 2 seconds after the gravitational-wave candidate's coalescence time. The Fermi trigger's localization estimate from Fermi data alone can be found here

https://heasarc.gsfc.nasa.gov/FTP/fermi/data/gbm/triggers/2017/bn170817529/quicklook/glg_locplot_all_bn170817529.png
https://heasarc.gsfc.nasa.gov/FTP/fermi/data/gbm/triggers/2017/bn170817529/quicklook/glg_locprob_all_bn170817529.fit

Analyses including data from H1, L1, and V1 are ongoing and a sky-map using gravitational-wave data will be made available as quickly as possible.

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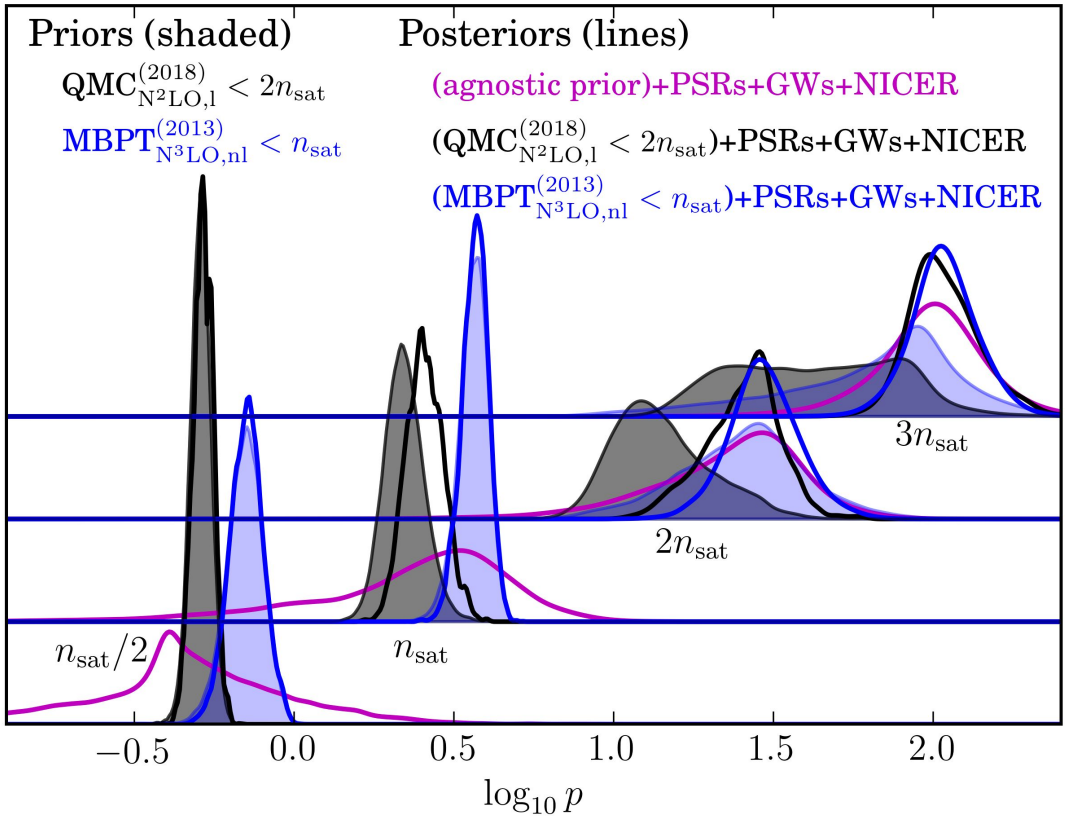

Equation of State Constraints

Landry+Essick PRD **99** 084049 (2019)
Essick+ PRD **101** 063007 (2020)
Landry+ PRD **101** 123007 (2020)
Essick+ arXiv:2004.07744 (2020)

Nonlinear Tides

Essick+ PRD 94 103012 (2016)
Abbott+ PRL 122 061104 (2019)

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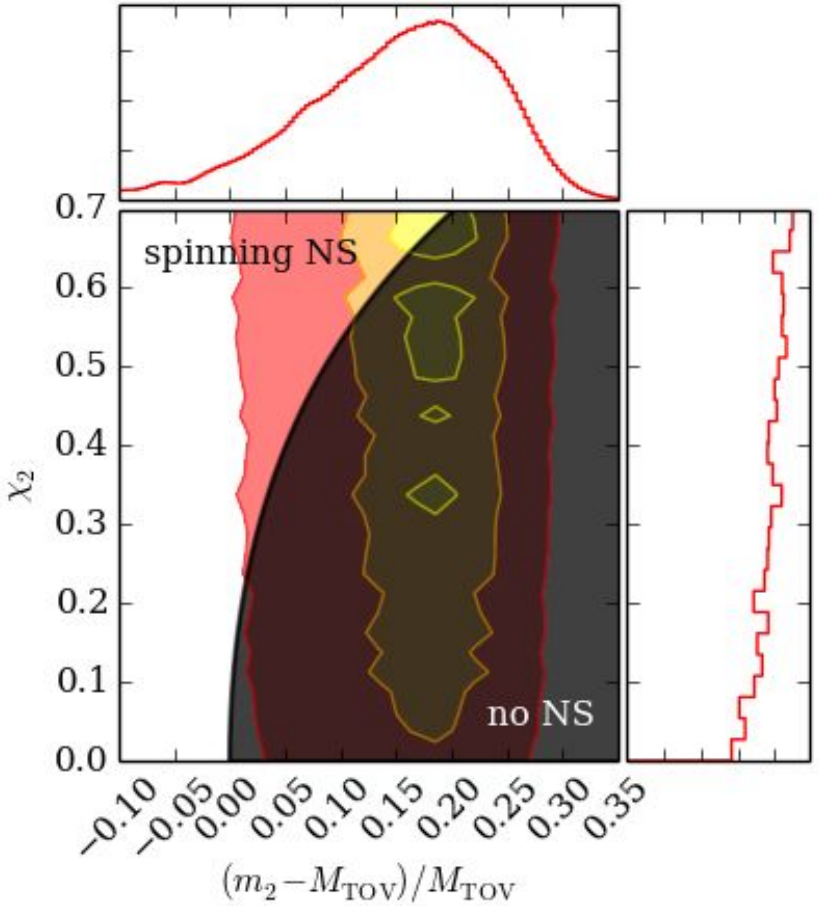

Focussing on how knowledge of EoS helps other aspects of GW astronomy and vice versa

Population inference

Fishbach+ ApJ Lett. **899** 1 (2020)

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Would love to chat!

How can GWs help your research?