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SUPPLEMENTARY INFORMATION

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A Hubble constant measurement from superluminal motion of the jet in GW170817

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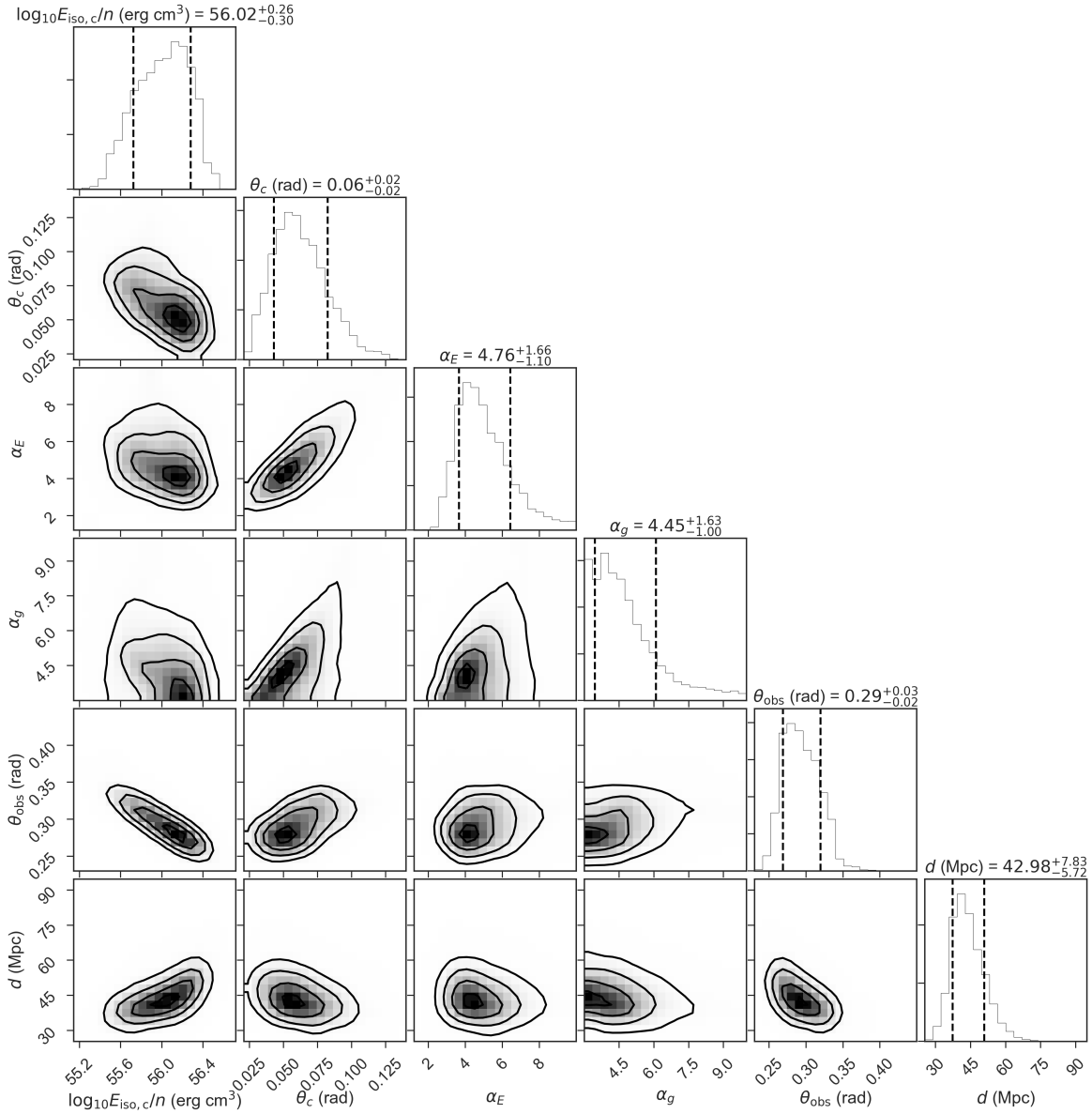
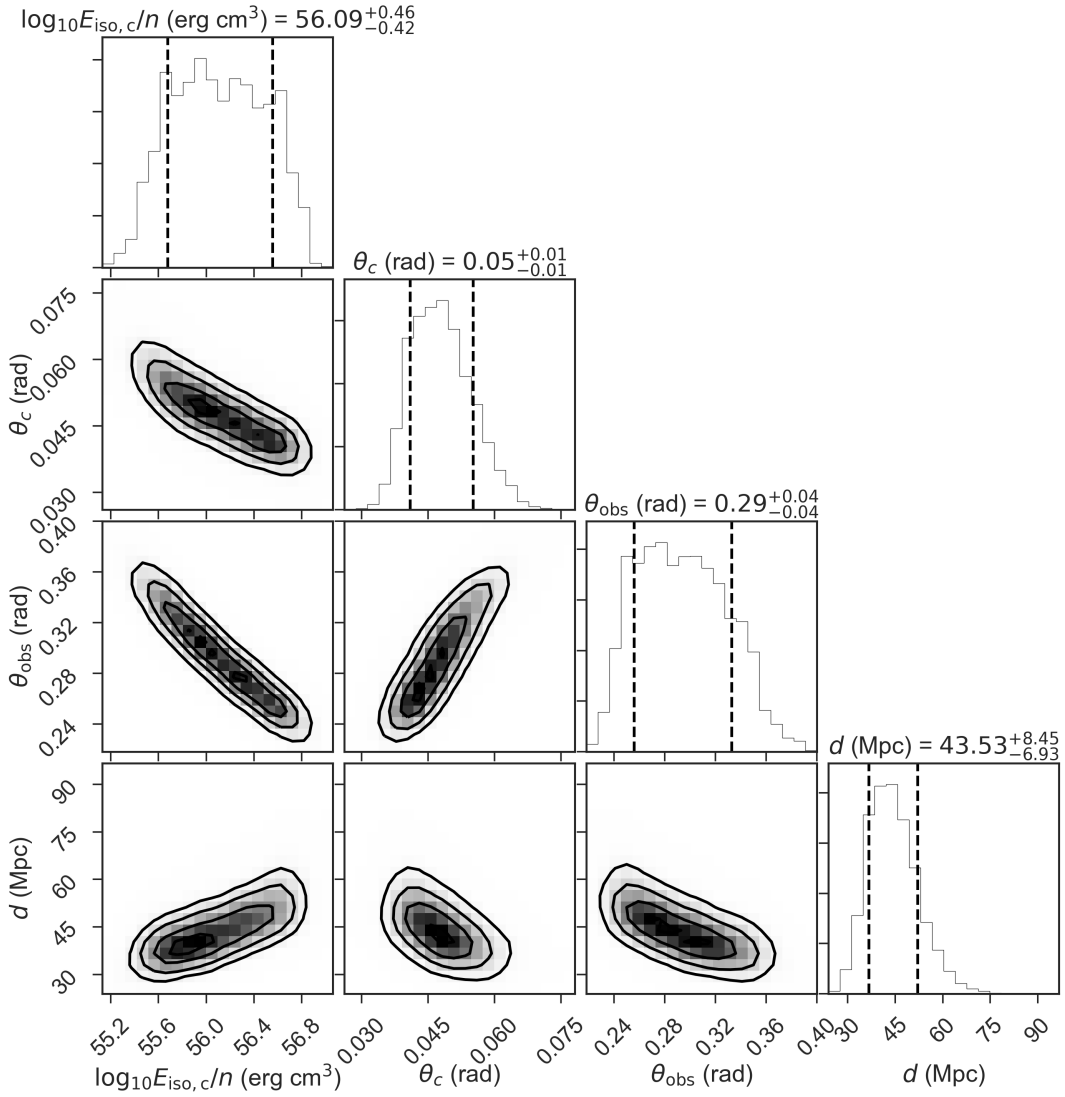
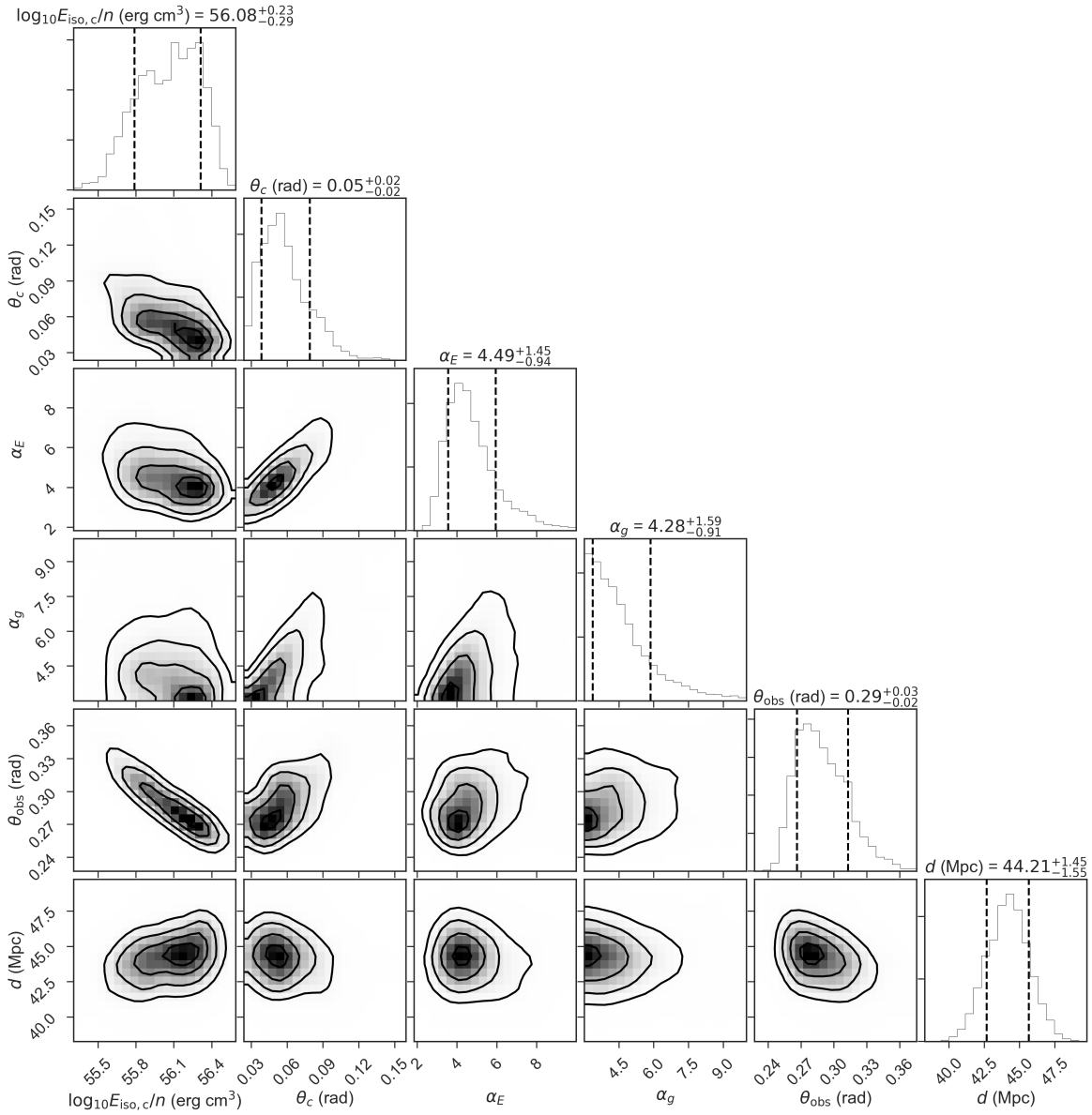
Supplementary Information



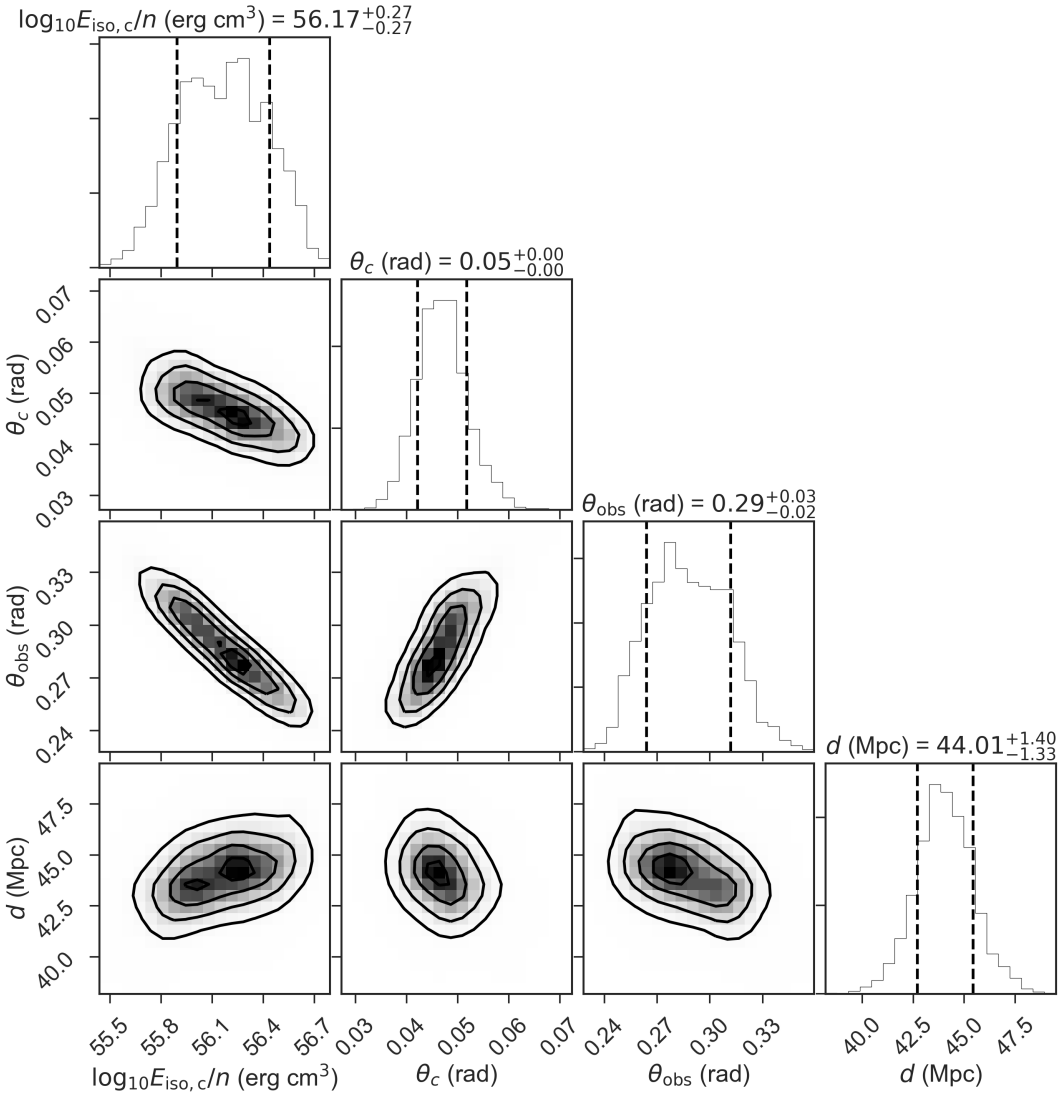
Supplementary Figure 1: **Corner plot[1] for a Power-Law Jet model.** The afterglow light curve at 3 GHz and the centroid motion resolved by VLBI are used as the observed input data. Vertical lines depict 68% credible intervals.



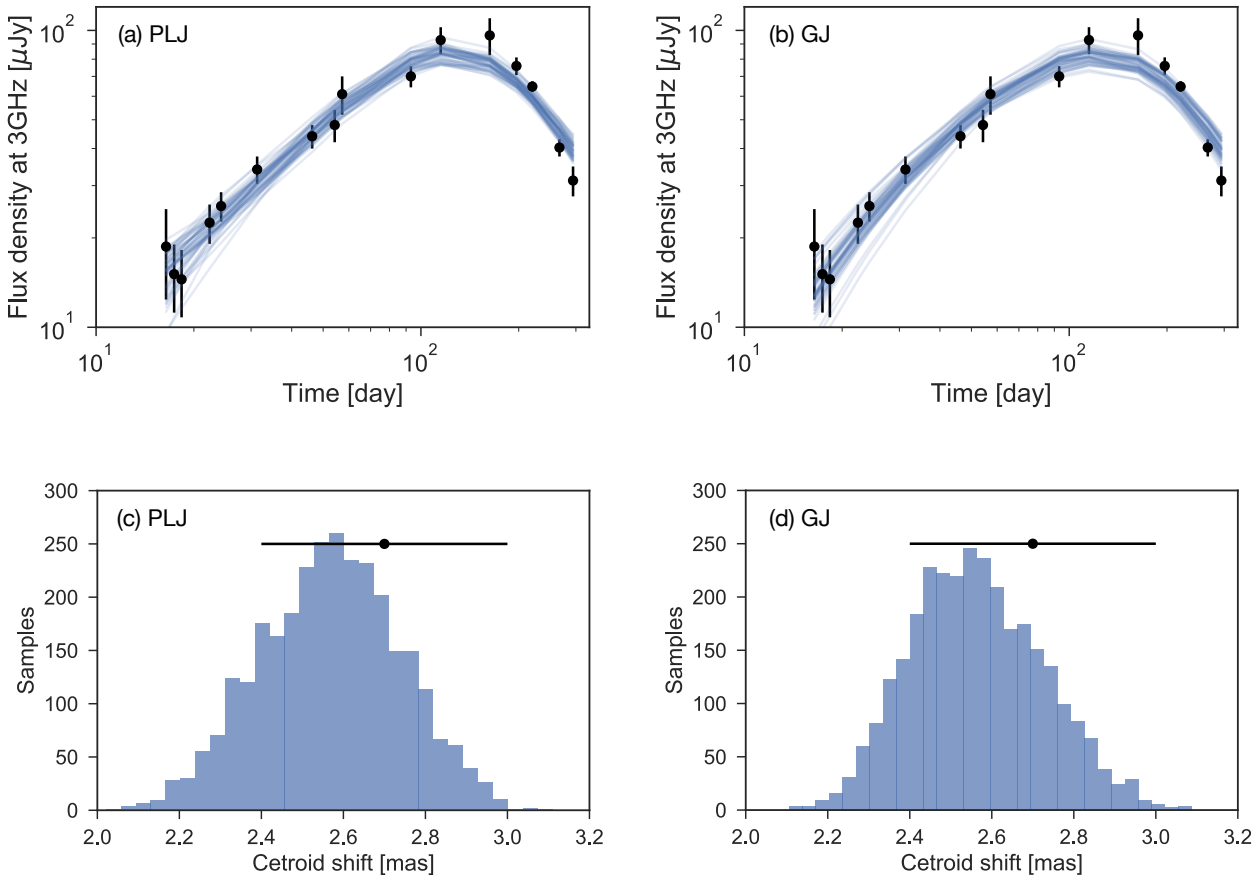
Supplementary Figure 2: **Same as Figure 1 but for a Gaussian Jet model.**



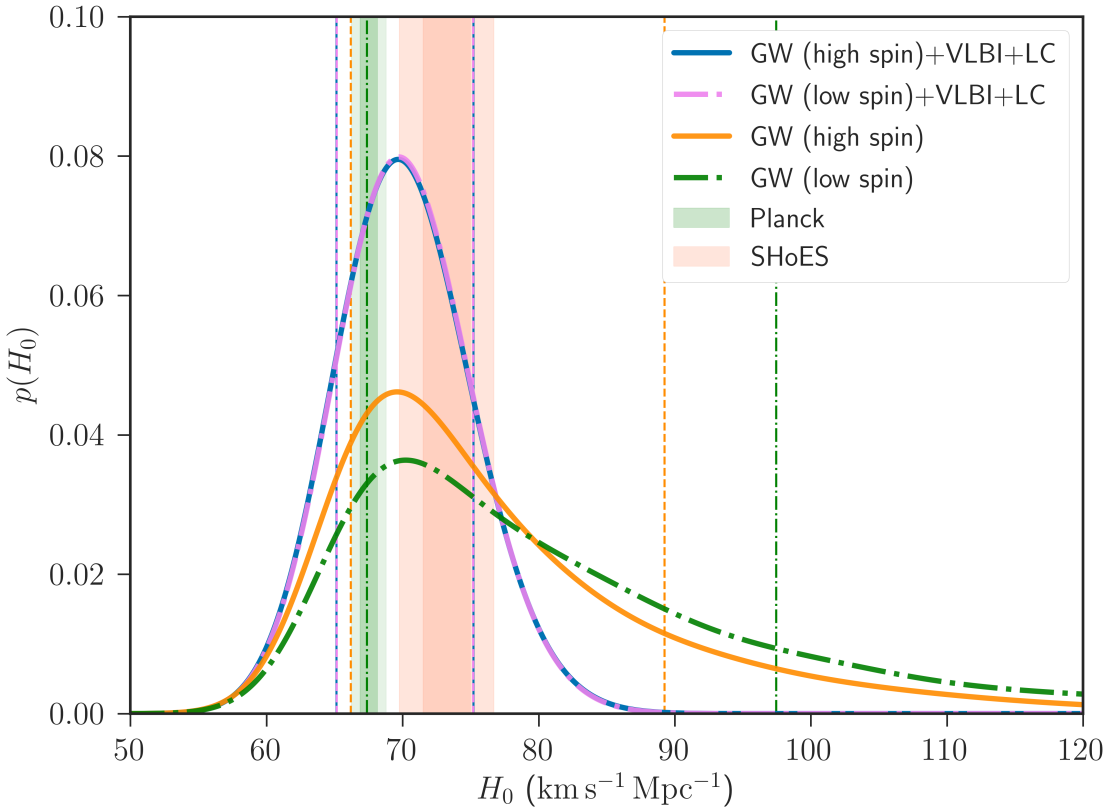
Supplementary Figure 3: **Corner plot for the combined GW-EM analysis with a Power-Law Jet model.** The afterglow light curve at 3 GHz and the centroid motion resolved by VLBI are used as the observed input data. Vertical lines depict 68% credible intervals. Here we use high spin PhenomNR posterior.



Supplementary Figure 4: **Same as Figure 3 but for a Gaussian Jet model.**



Supplementary Figure 5: **Afterglow light curve at** 3 **GHz and centroid motion from day 75 to 230 with 1**σ **uncertainties.** Also shown are the light curves calculated with (a) a PLJ and (b) a GJ model, where 50 sets of the model parameters are randomly chosen from the MCMC samples. *Bottom* panels show the histogram of the centroid motion with 3000 samples randomly chosen: (c) a PLJ model and (d) a GJ model. These are the results of the combined GW-VLBI-LC analysis.



Supplementary Figure 6: **Comparison between the H_0 posteriors of the high and low spin priors.** Here we use hydrodynamics simulation jet model ($0.25 < \theta_{\rm obs}\left(\frac{d}{41\ {\rm Mpc}}\right) < 0.5$ rad). Solid blue curve: the GW-VLBI-LC analysis with the high-spin prior, dash-dotted purple curve: the GW-VLBI-LC analysis with the low-spin prior, solid orange curve: the GW-only analysis with the high-spin prior, and dash-dotted green curve: the GW-only analysis with the low-spin prior. The vertical lines show symmetric 68% credible interval for each model.

References

1. Foreman-Mackey, D. corner.py: Scatterplot matrices in python. The Journal of Open Source Software **24** (2016). URL http://dx.doi.org/10.5281/zenodo.45906.