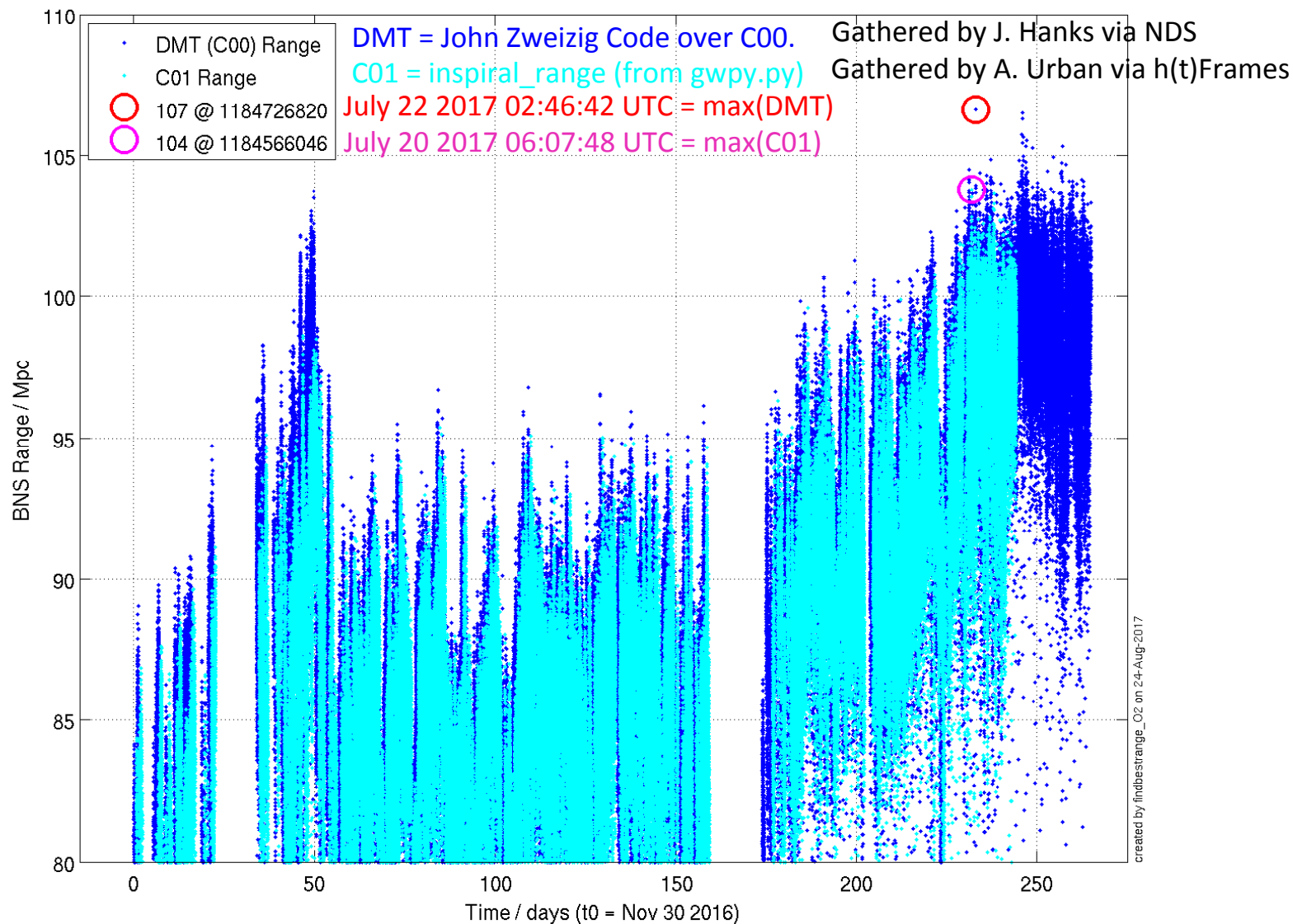


Determining L1's "BEST" Range in O2

J. Kissel, for the Calibration Team

“All” of O2 BNS Range, DMT vs C01

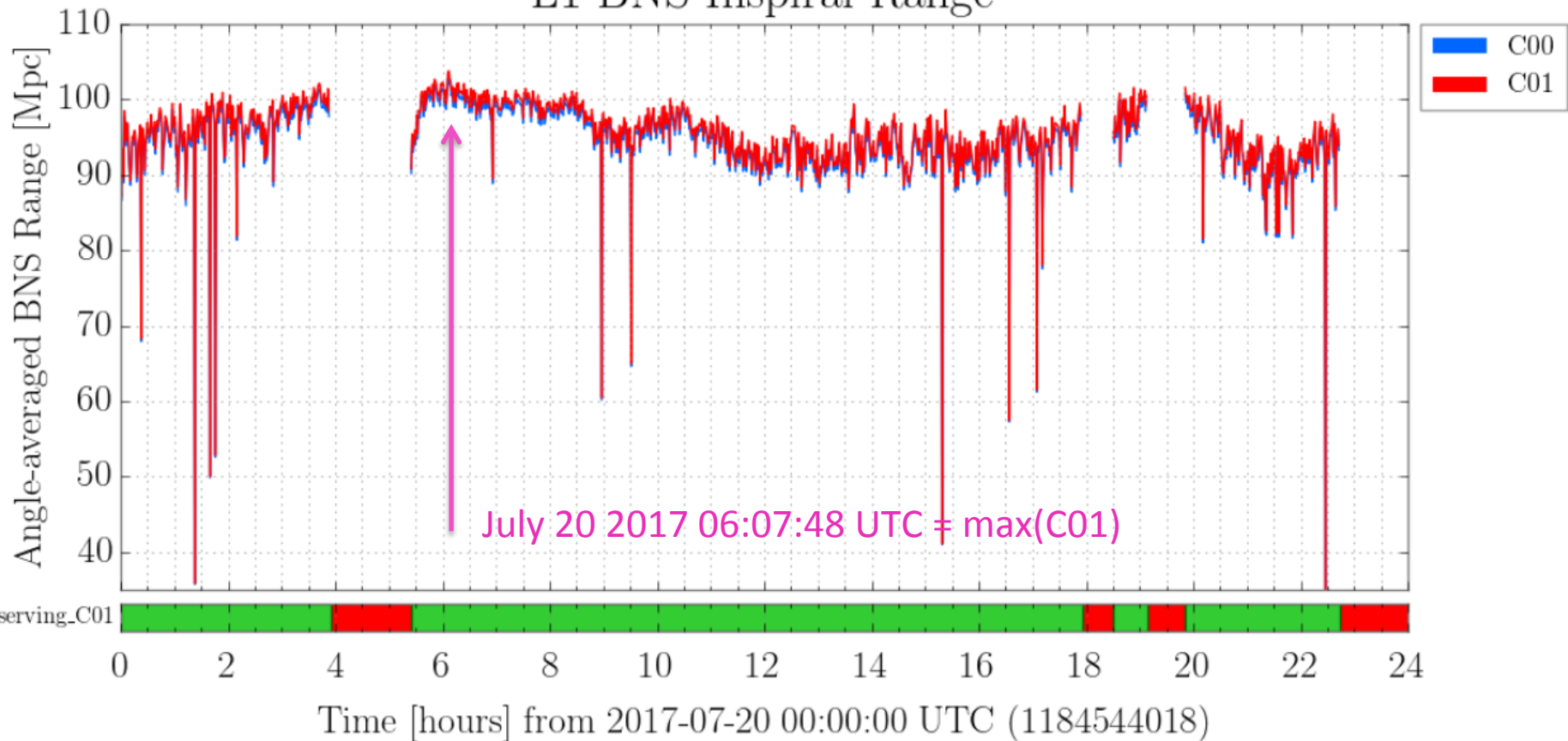
O2 Performance To Date, L1



Note – C01 data only up to Aug 1 2017 was available at the time of this “best” time assessment. We assume range has not gotten substantially better (more than 1 sigma of Calibration Uncertainty) in the remainder of the run

July 20 2017

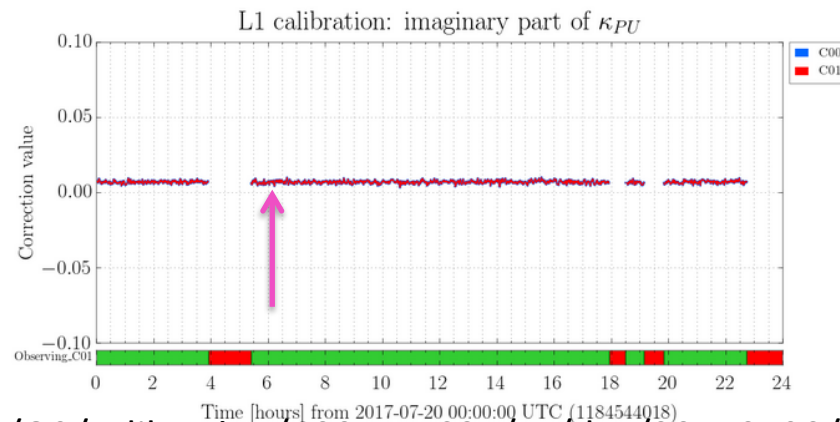
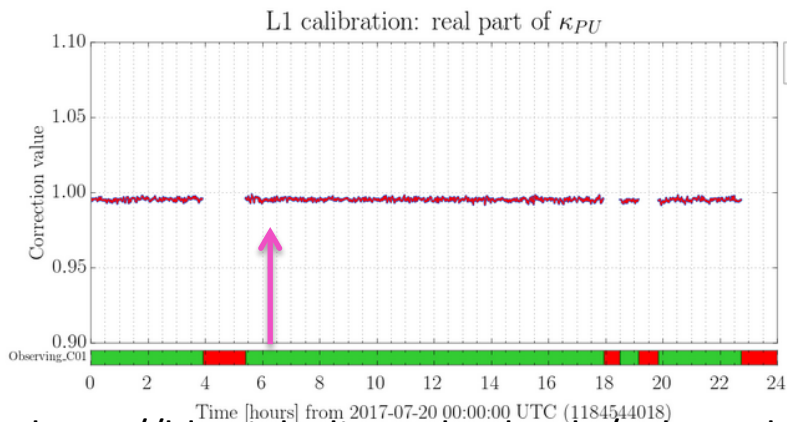
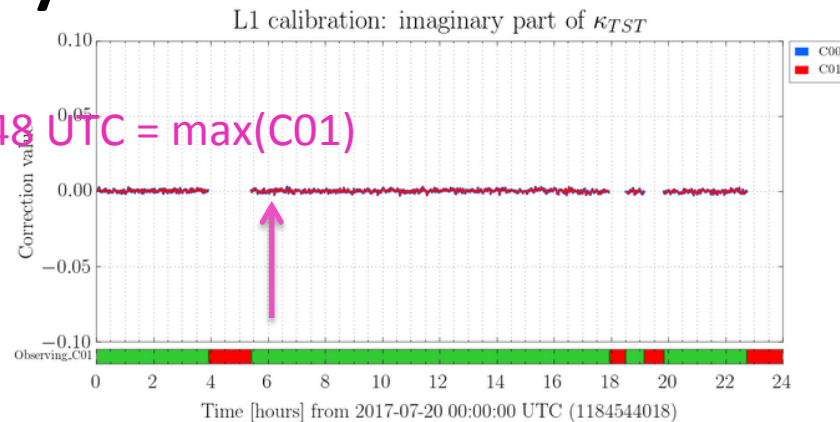
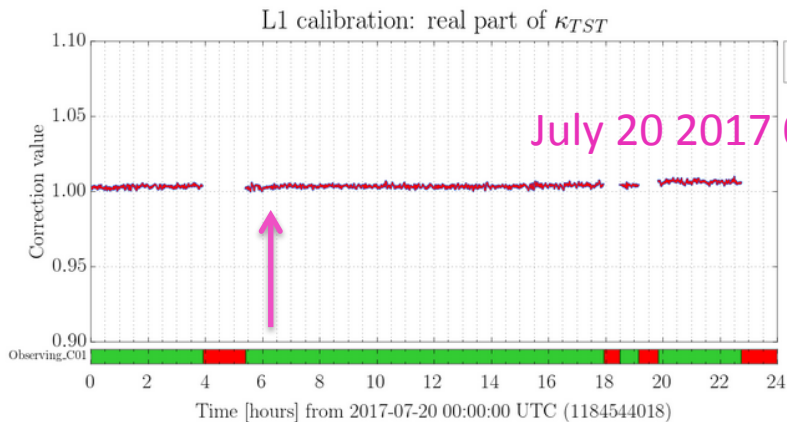
L1 BNS Inspiral Range



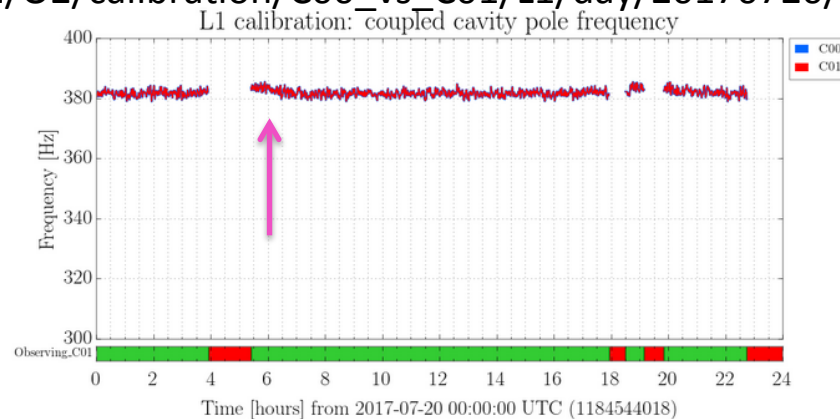
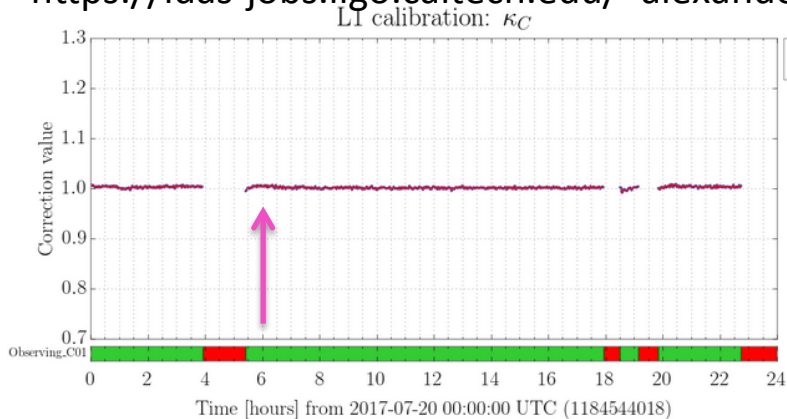
Why is C00 different from Slide 2? → Summary Pages compute C00 and C01 range with `gwpy.py inspiral_range`, where as DMT is computed by some Zweizig code.

https://ldas-jobs.ligo.caltech.edu/~alexander.urban/O2/calibration/C00_vs_C01/L1/day/20170720/

~30min Into Very Stable Lock

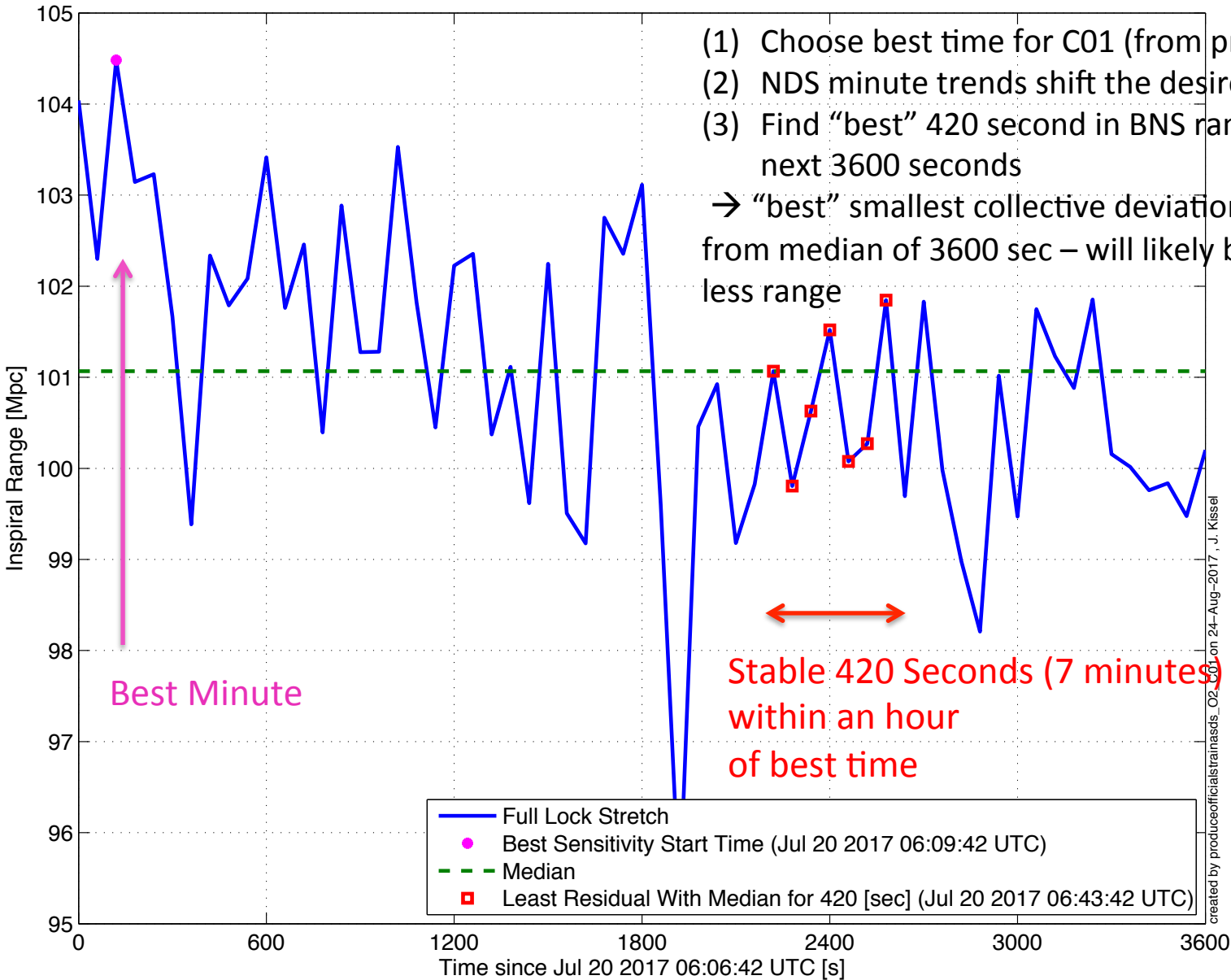


https://ldas-jobs.ligo.caltech.edu/~alexander.urban/O2/calibration/C00_vs_C01/L1/day/20170720/



2017-07-20 Time of ASD Choice

L1:DMT-SNSH_EFFECTIVE_RANGE_MPC.mean,m-trend

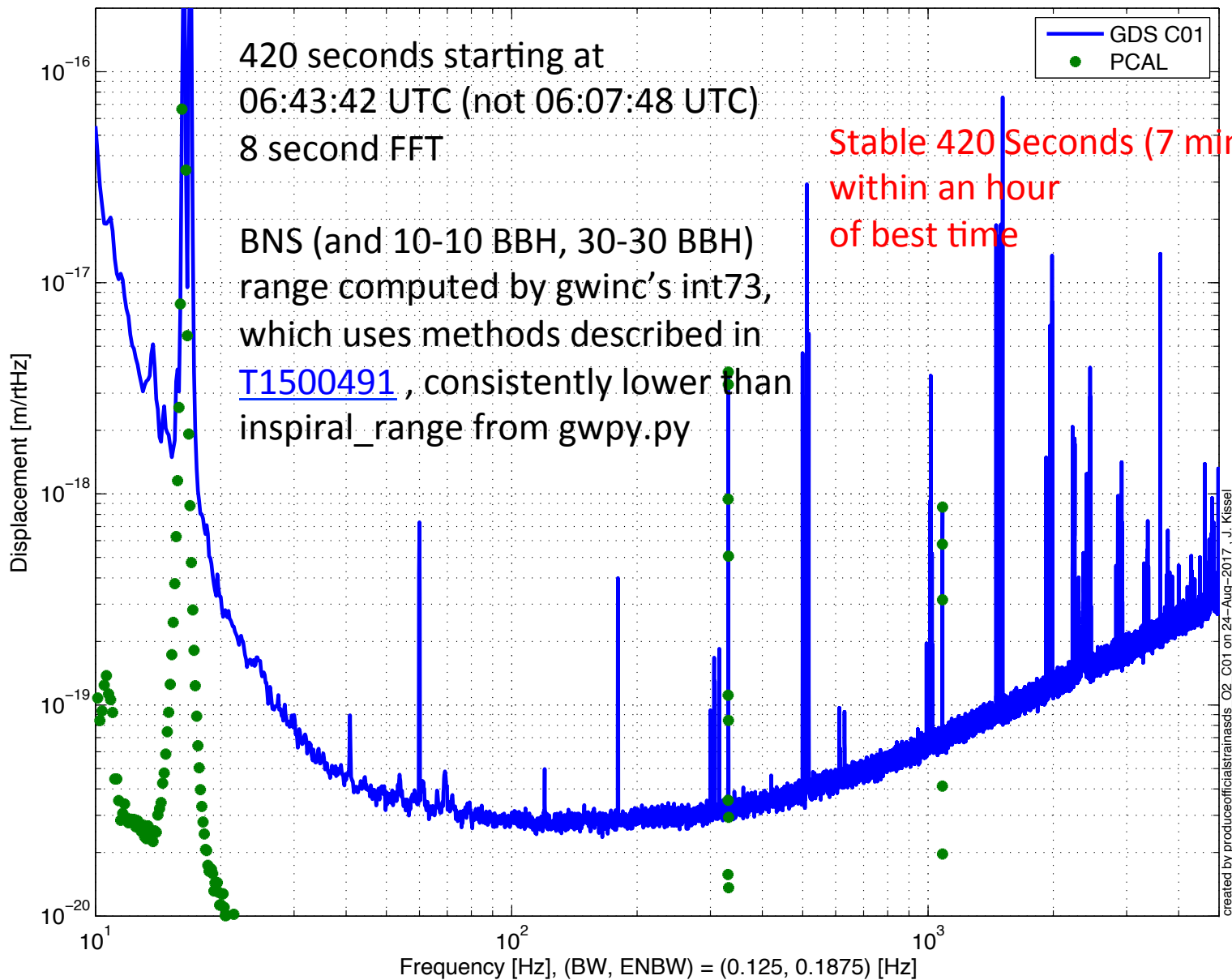


- (1) Choose best time for C01 (from previous slides)
 - (2) NDS minute trends shift the desired time slightly
 - (3) Find "best" 420 second in BNS range (using DMT) in the next 3600 seconds
- "best" smallest collective deviation from median of 3600 sec – will likely be a time with slightly less range

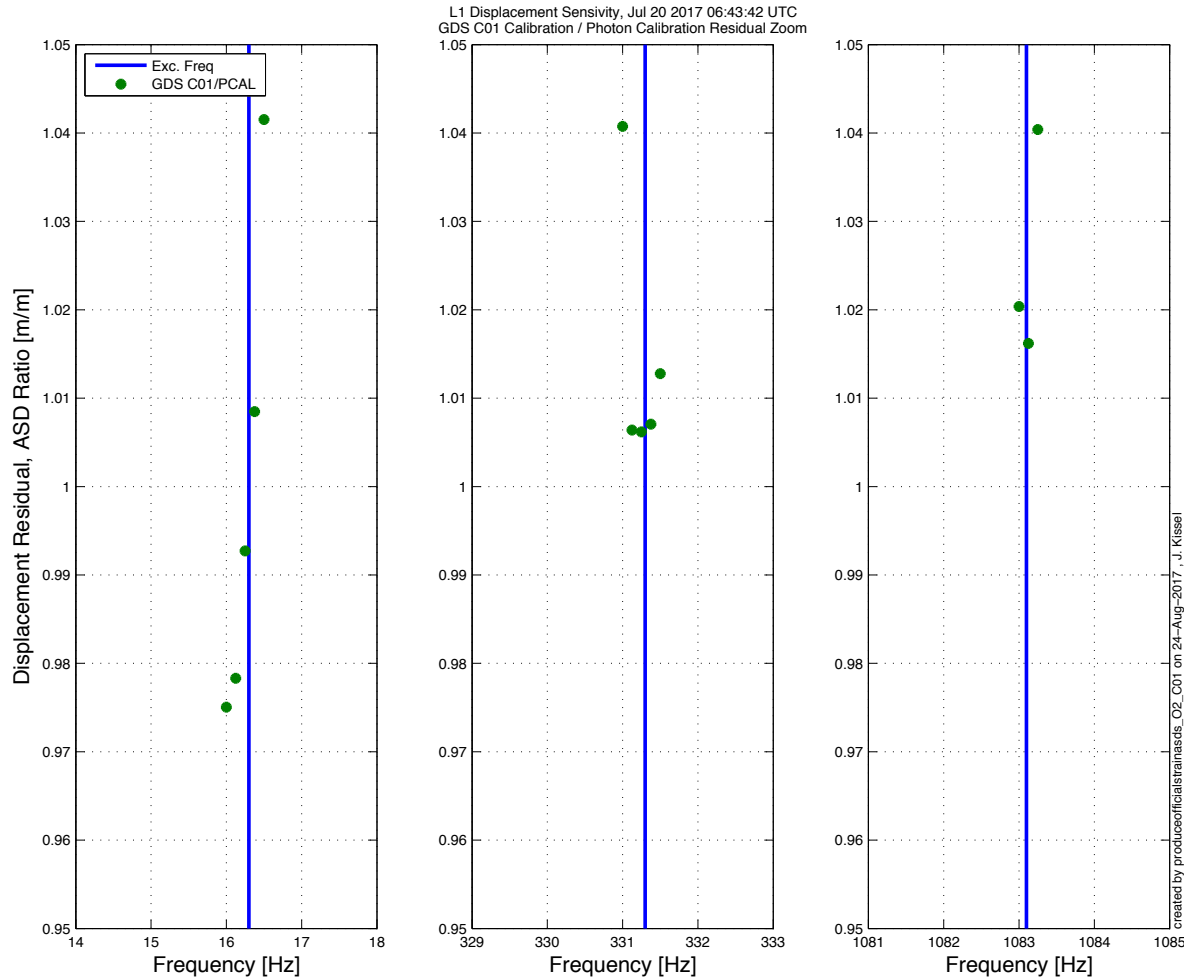
created by produceofficialstrainasds_O2_C01 on 24-Aug-2017, J. Kissel

Compute 100 avg ASD of C01 h(t)

L1 Displacement Sensivity, Jul 20 2017 06:43:42 UTC
Input Power 25.8 [W], $D_{\text{SenseMon}}(1.4/1.4, 10/10, 30/30 [M_{\text{sol}}]) = (98.18, 494, 1218) [\text{Mpc}]$



See Full Detailed Plots



C01 h(t) [m] / PCALY RXPDP [m]

Within 1% at 16.3 and 331.3 Hz
Within 2% at 1083.1 Hz

Consistent with Uncertainty & Error Estimate [P1600139](#)

- plots produced by standard script:

```
/ligo/svncommon/CalSVN/aligocalibration/trunk/Runs/02/Common/  
Scripts/DARMASDs/produceofficialstrainasds_02_C01.m
```

Performance Improvement

