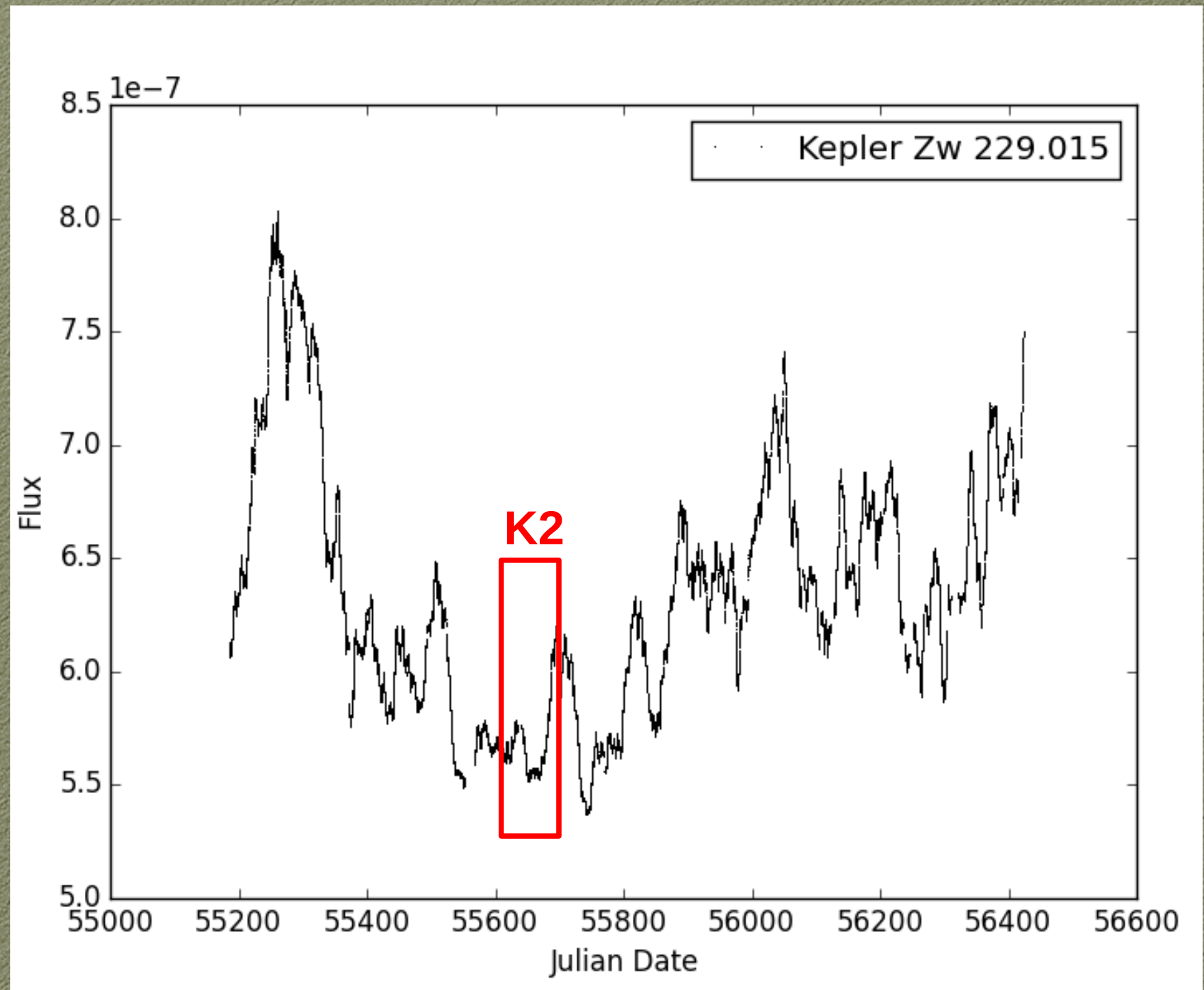# AGN Variability

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Quasar Day 2016
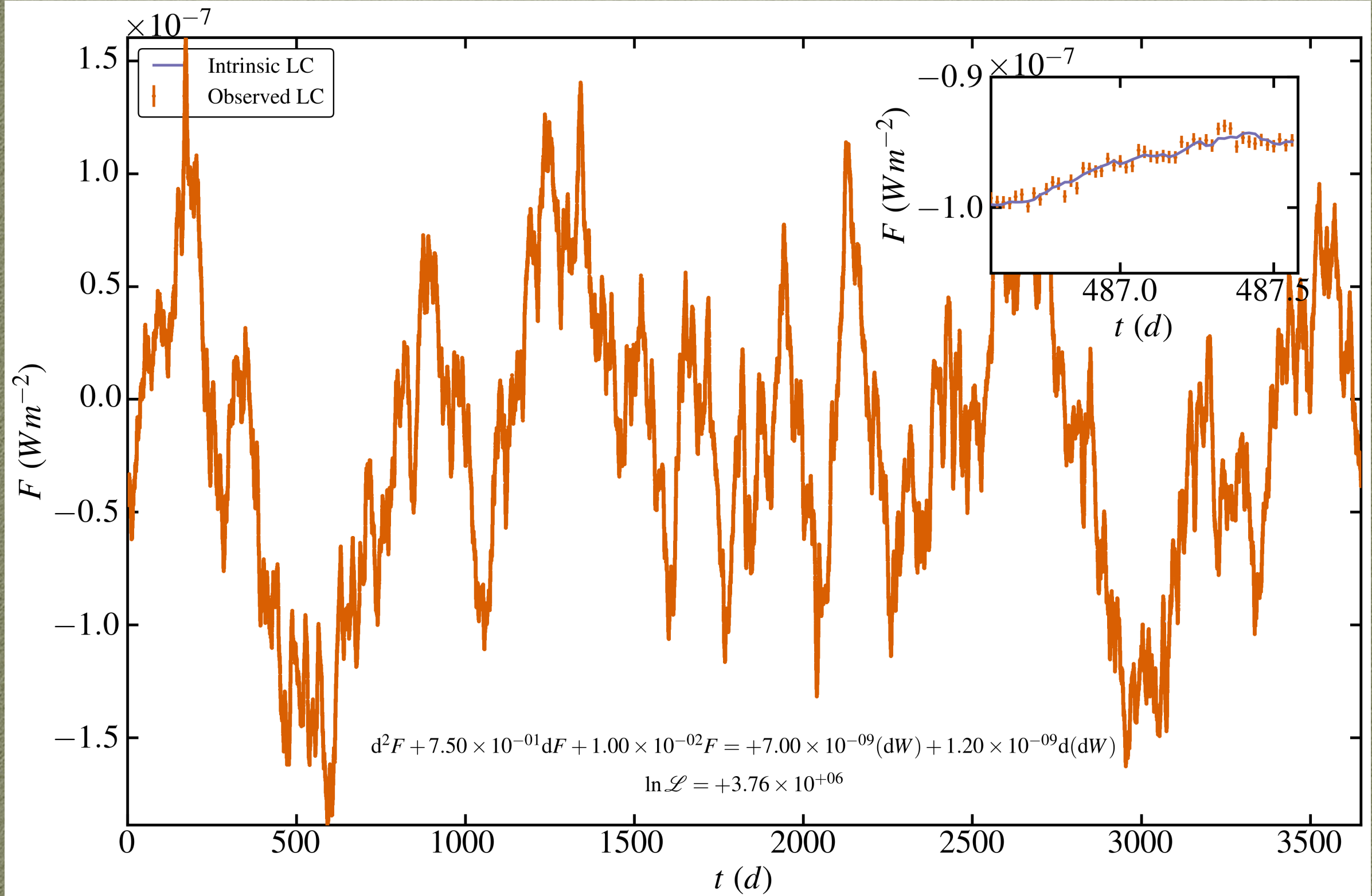
AGN lightcurves

highly regular 30 min sampling rate
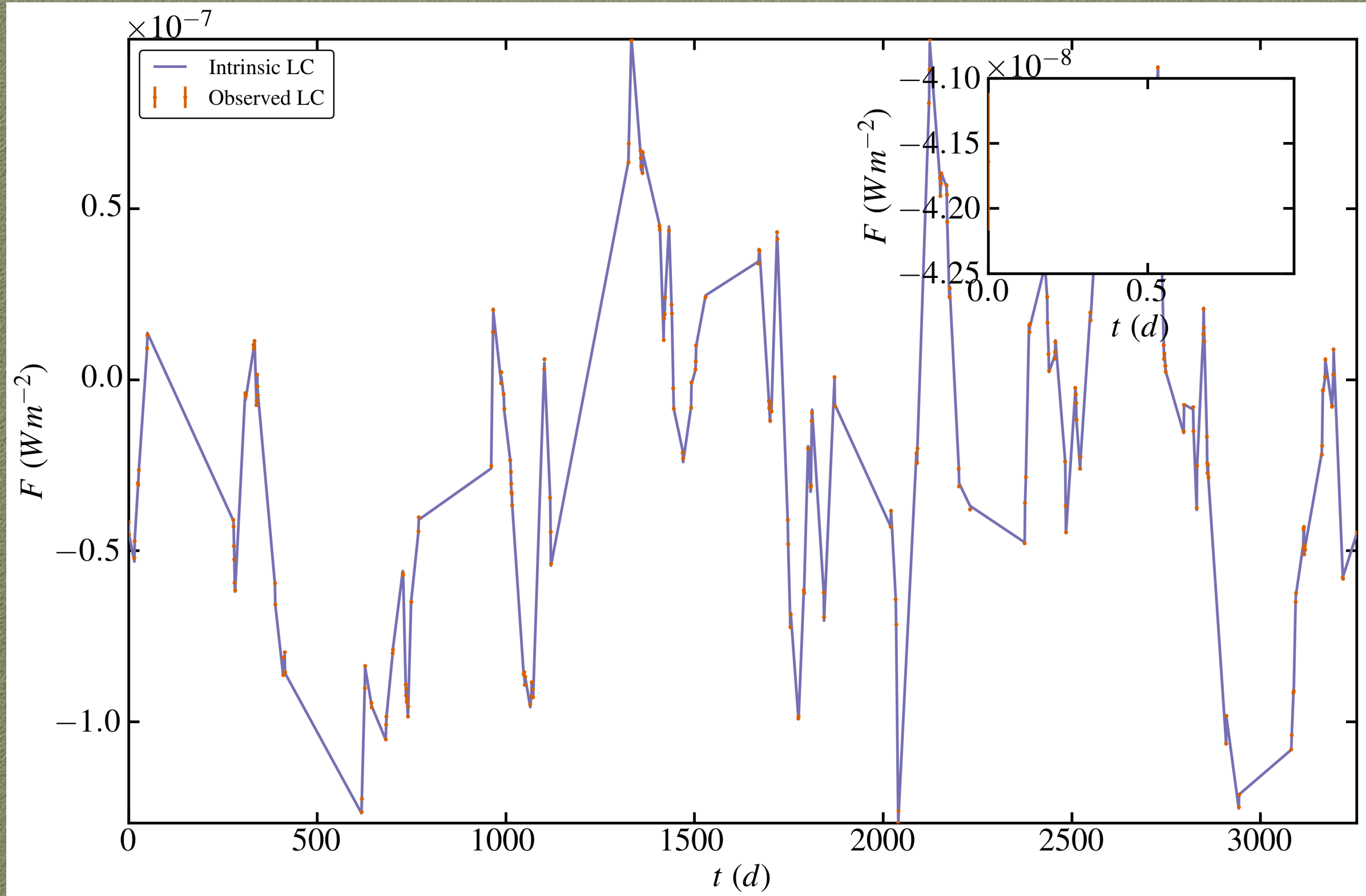
Legend:
- Intrinsic LC
- Observed LC

$$\mathrm{d}^2 F + 7.50 \times 10^{-01} \mathrm{d}F + 1.00 \times 10^{-02} F = +7.00 \times 10^{-09}(\mathrm{d}W) + 1.20 \times 10^{-09}\mathrm{d}(\mathrm{d}W)$$

$$\ln \mathscr{L} = +3.76 \times 10^{+06}$$

LSST Simulated Cadences – Enigma 1189

- g & r bands

Standard field (~250)

Deep drilling field (~600)

- all bands

Standard field (~800)

Deep drilling field (~14,000)

These cadences are constrain by weather, airmass, target observability etc.

$a_1 = 5.39^{+1.87}_{-1.39} \times 10^{-1}$

AR input
Coefficients:
a1 = 0.75
a2 = 0.01

g & r band
standard cadence
($\sim$250 measurements
in 10 yr)

$a_2 = 7.01^{+2.24}_{-1.76} \times 10^{-3}$

$b_0 = 5.24^{+1.49}_{-1.12} \times 10^{-9}$

MA input
Coefficients:
B0 = 7.0e-9
B1 = 1.2e-9

$b_1 = 2.39^{+0.57}_{-0.77} \times 10^{-9}$
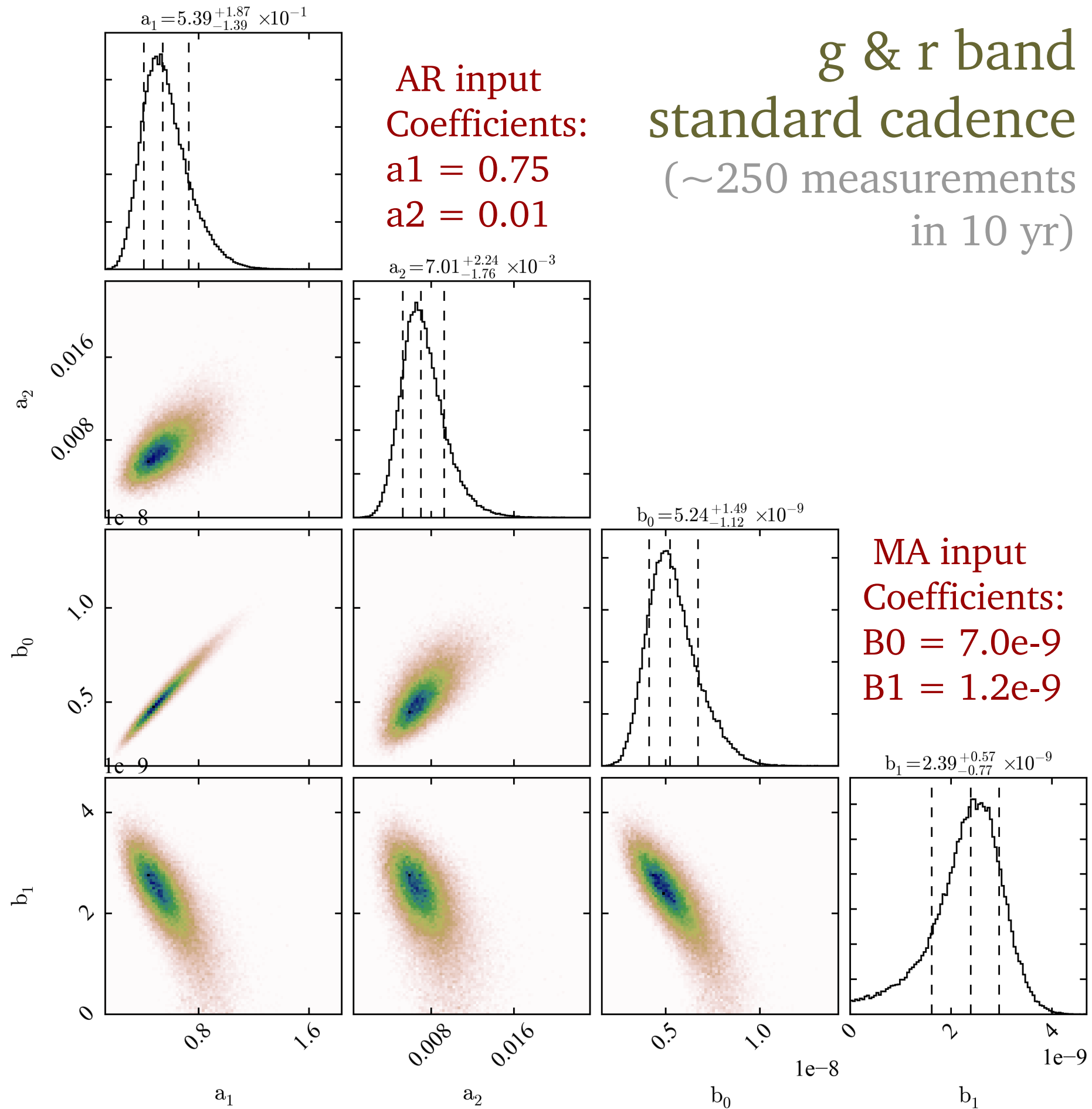
Conclusions and Continuing Work

- There is a minimum number of measurements required to accurately recover the correct model order and coeffients (under 200)
- Some clustering of points is necessary to capture short timescale correlation structure.
- Irregularly sampled mock lightcurves of order (AR, MA)= {(3,2), (3,1), (3,0), (2,1), (2,0), (1,0)} were recovered accurately with LSST cadences using more than one band.

Conclusions and Continuing Work

- We will develop a metric to quantify the LSST observation strategy for AGN analysis

- We will look at K2 AGN lightcurves in the Stripe 82 to map were they live in CARMA parameter space

- We will also look at K2 AGN by subtypes.

References

[1] Kasliwal, V. et al. 2016 in prep
[2] Kelly B. C. et al. 2014, ApJ, 788, 33
[3]Mushotzky, R.F., Edelson, et al. 2011, APJl, 743, L12.
[4]Simm, T. et al. 2015 arXiv:1510.06737v1
[5] Starkey, D, Horne, K. et al. arXiv:1511.06162v1
[6]https://confluence.lsstcorp.org/display/SIM/OpSim+Datasets+for+Cadence+Workshop+LSST2015