

# *Achieved $1/f$ Noise*

*ABS, BICEP2/Keck Array, QUIET, ACTPol, SPTpol, PB*

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# Formula

- Model a NI by 1/f noise and estimate an “effective” NI from an actual error bar reported in a paper

$$N_\ell = N_0 \left[ 1 + \left( \frac{\ell}{\ell_{\text{knee}}} \right)^\alpha \right]$$

Note:  $N_1$  @ knee = 2 x  $N_0$

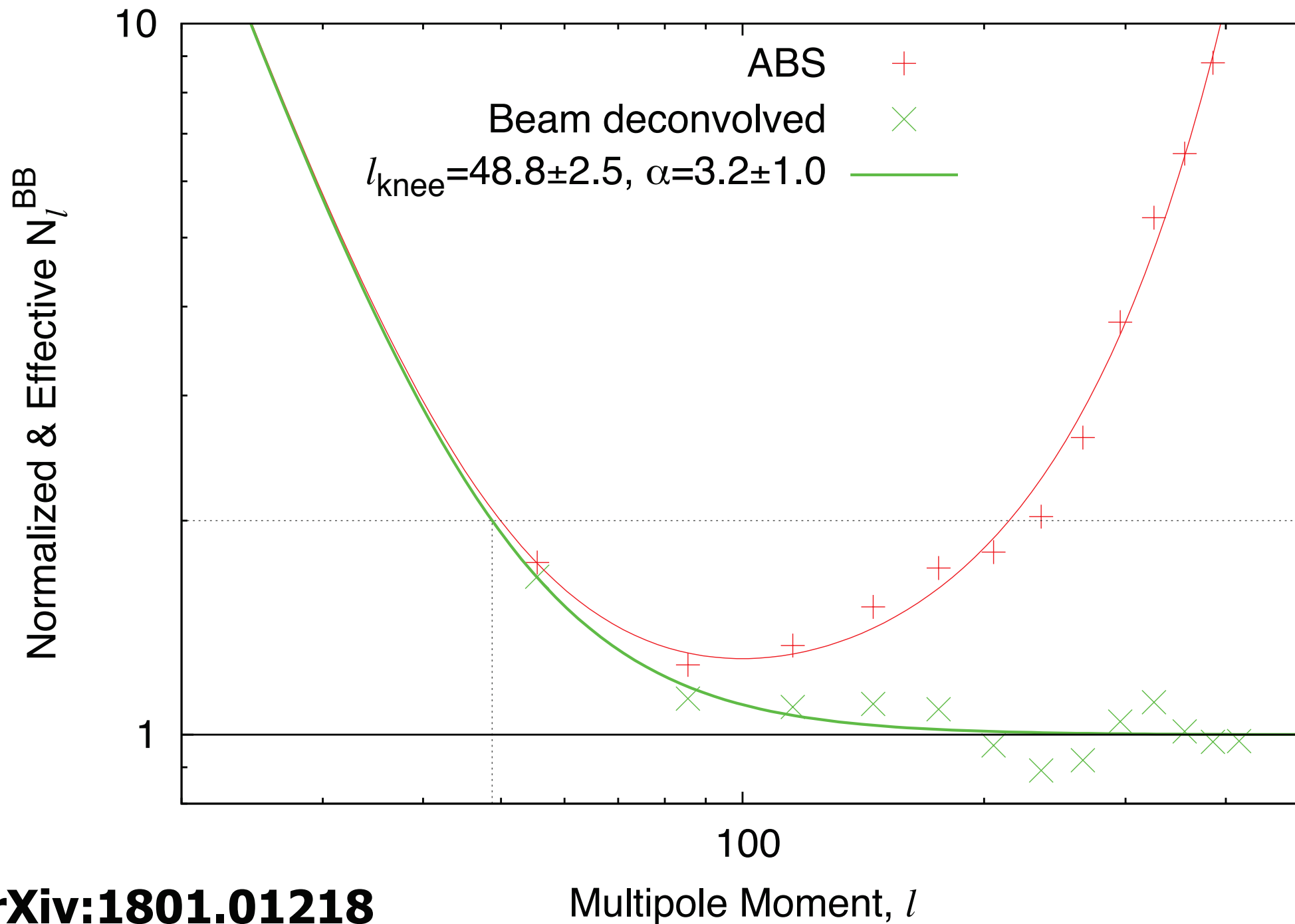


$$\hat{N}_\ell = \Delta D_\ell / \frac{\ell(\ell + 1)}{2\pi} \sqrt{\frac{2}{(2\ell + 1)\Delta\ell f_{\text{sky}}}}$$

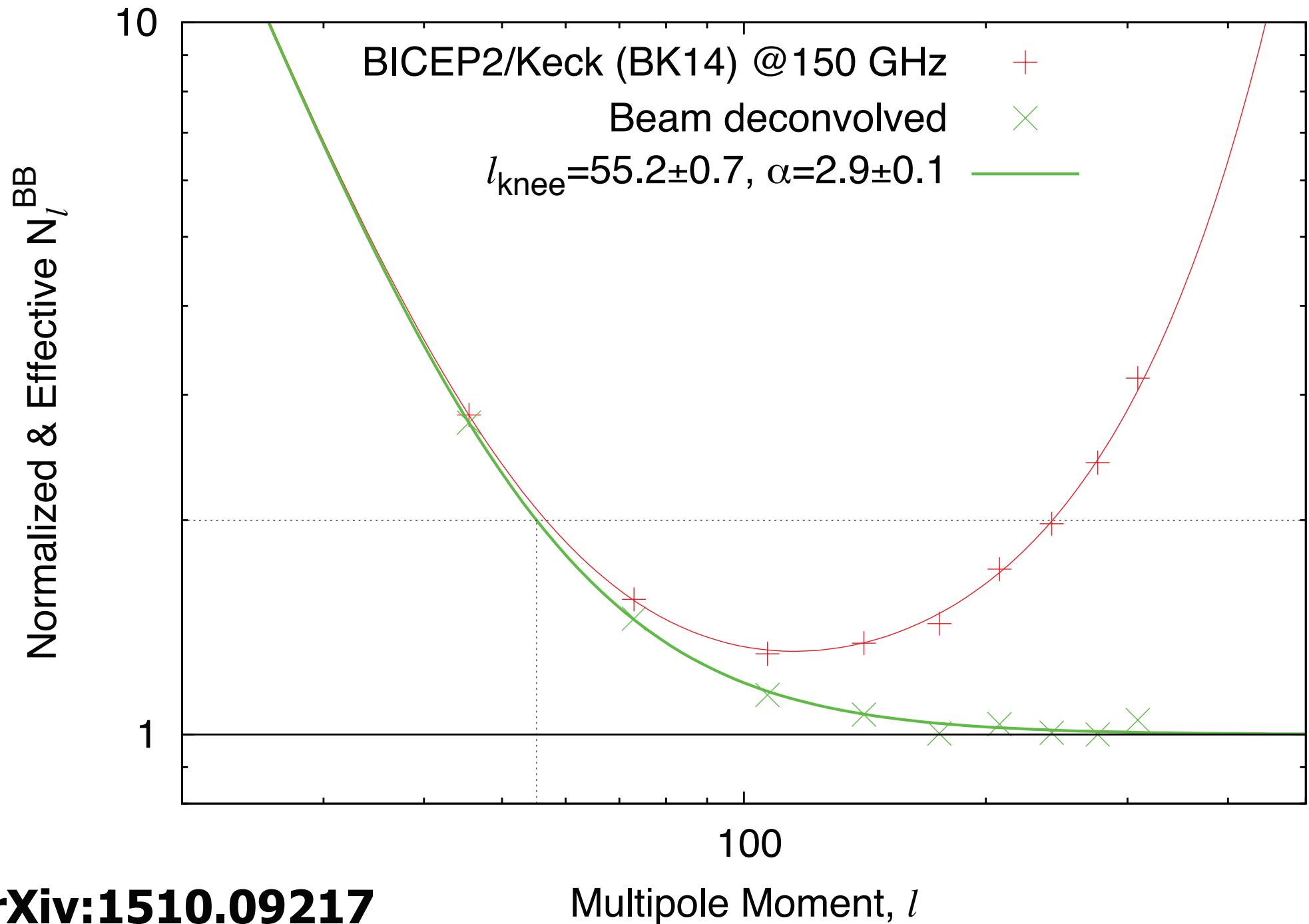
**error bar  
from a paper**

**and normalize by  $N_0$**

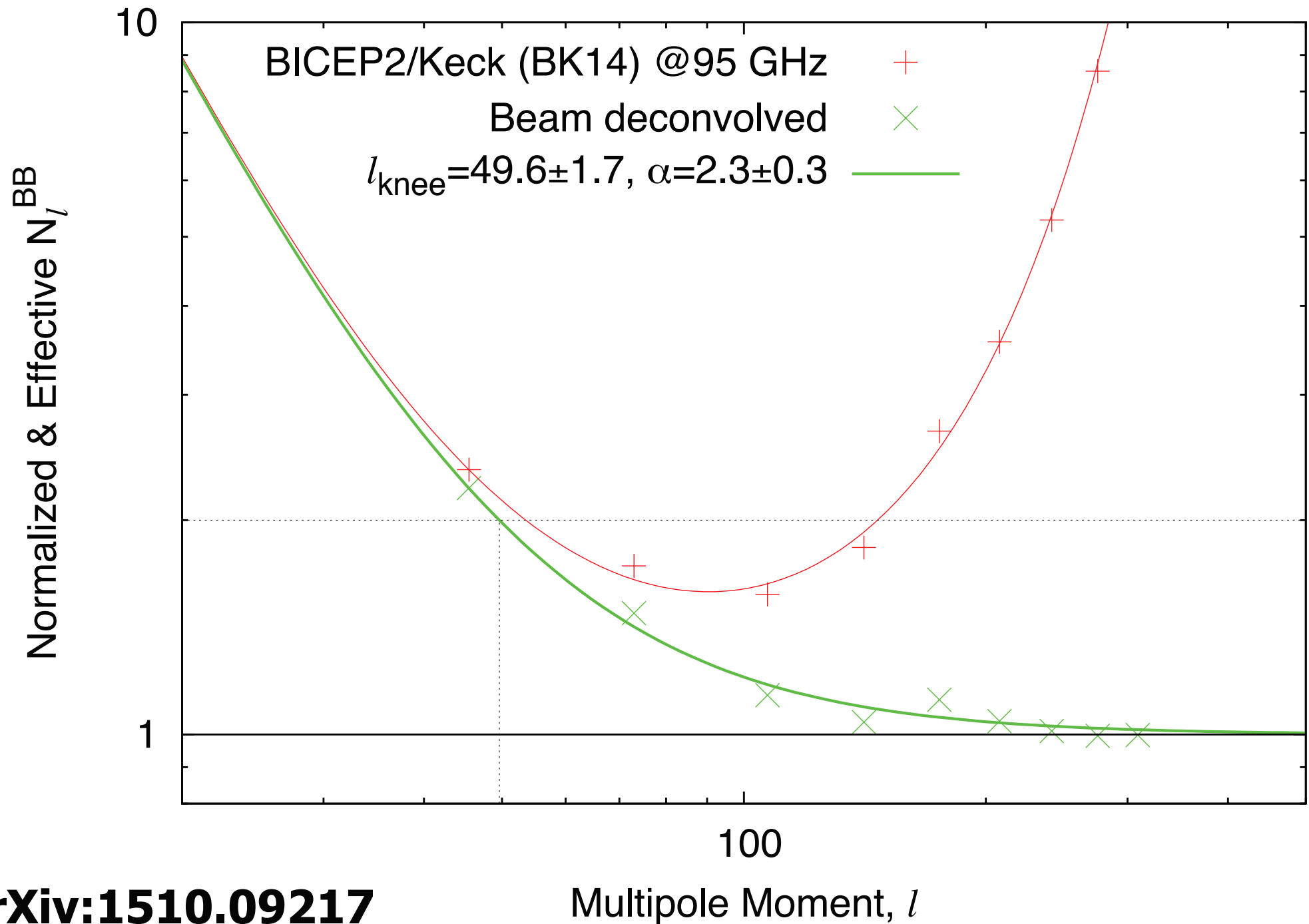
# ABS 145 GHz



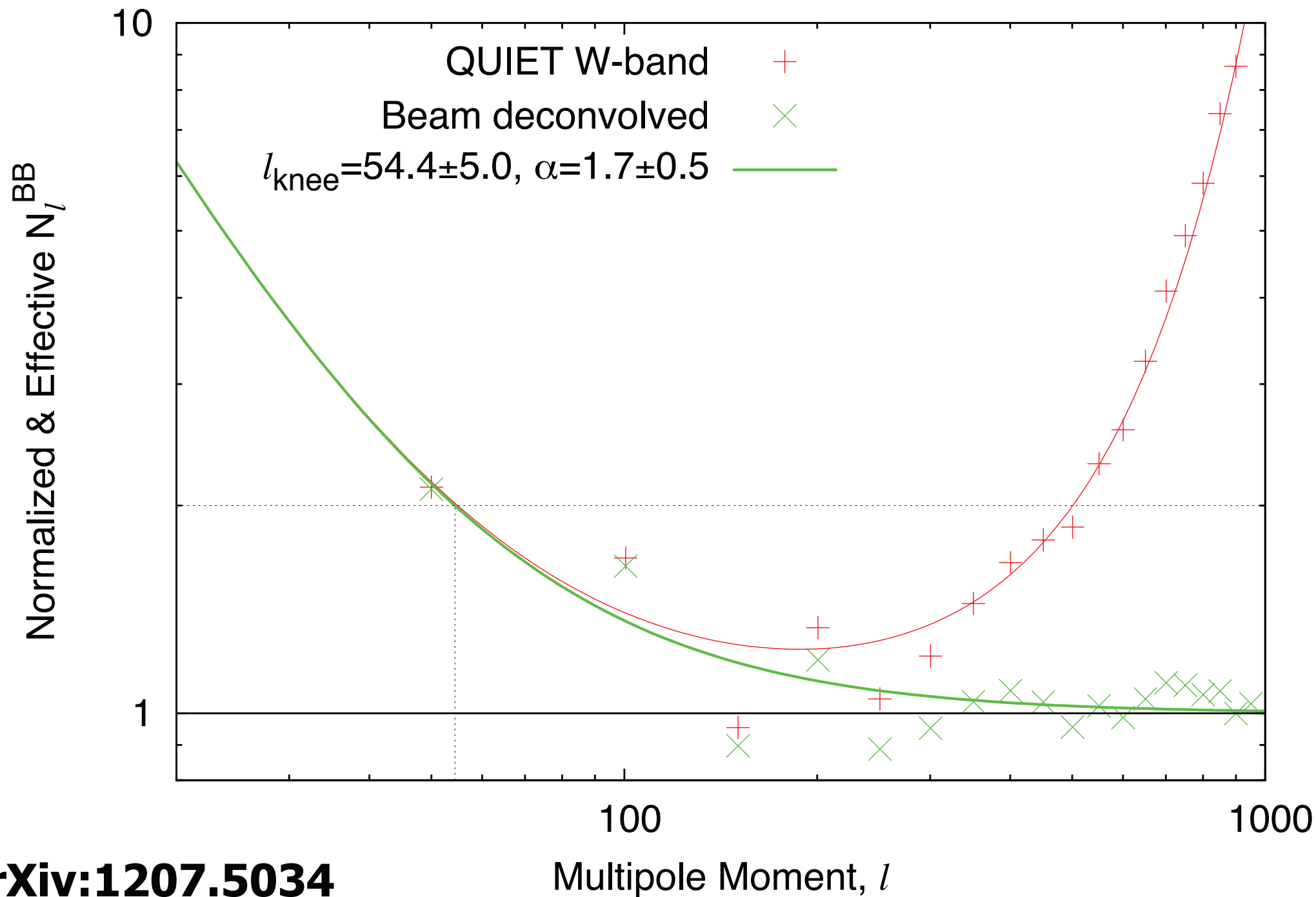
# BICEP2/Keck Array (BK14) 150 GHz



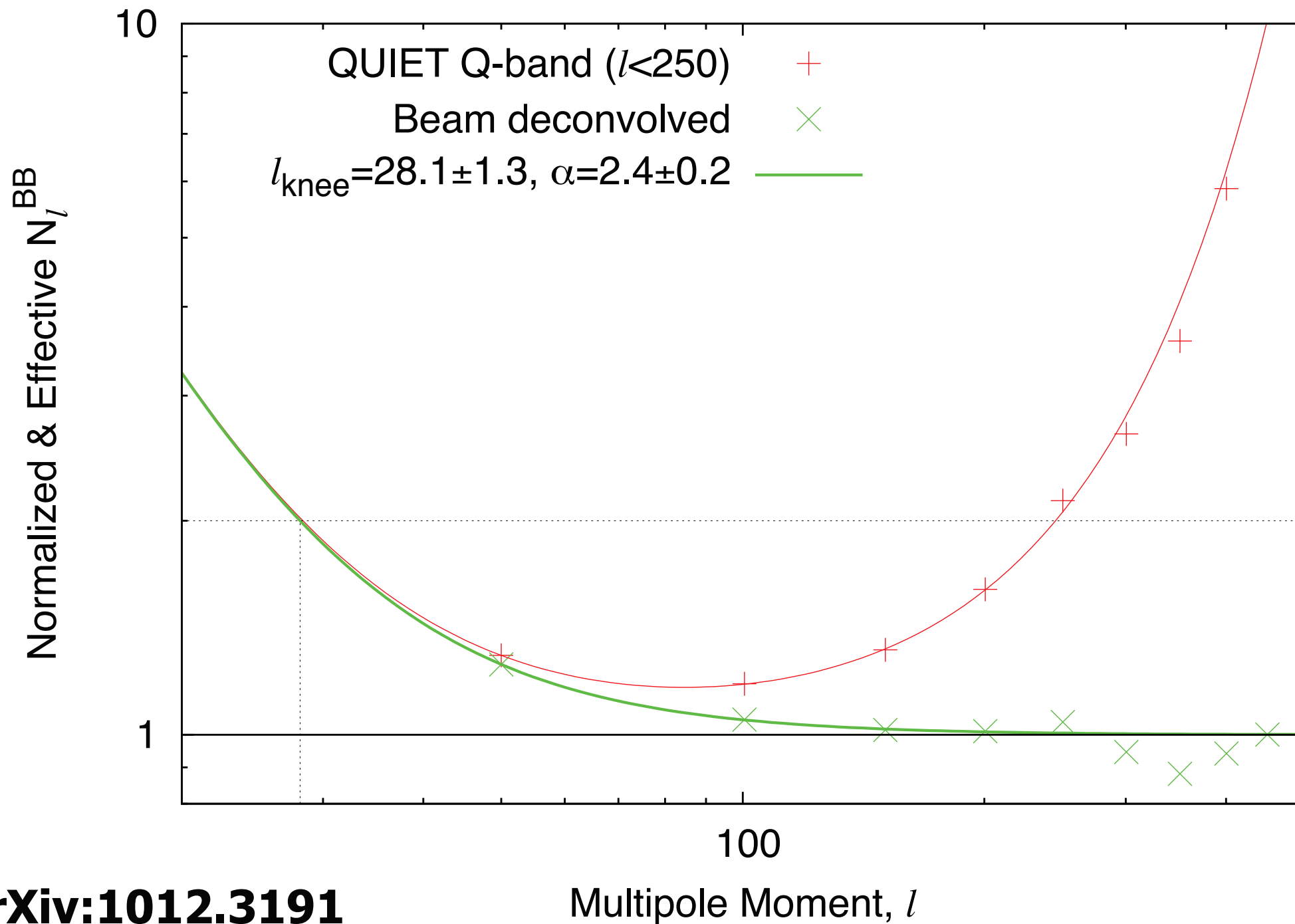
# BICEP2/Keck Array (BK14) 95 GHz



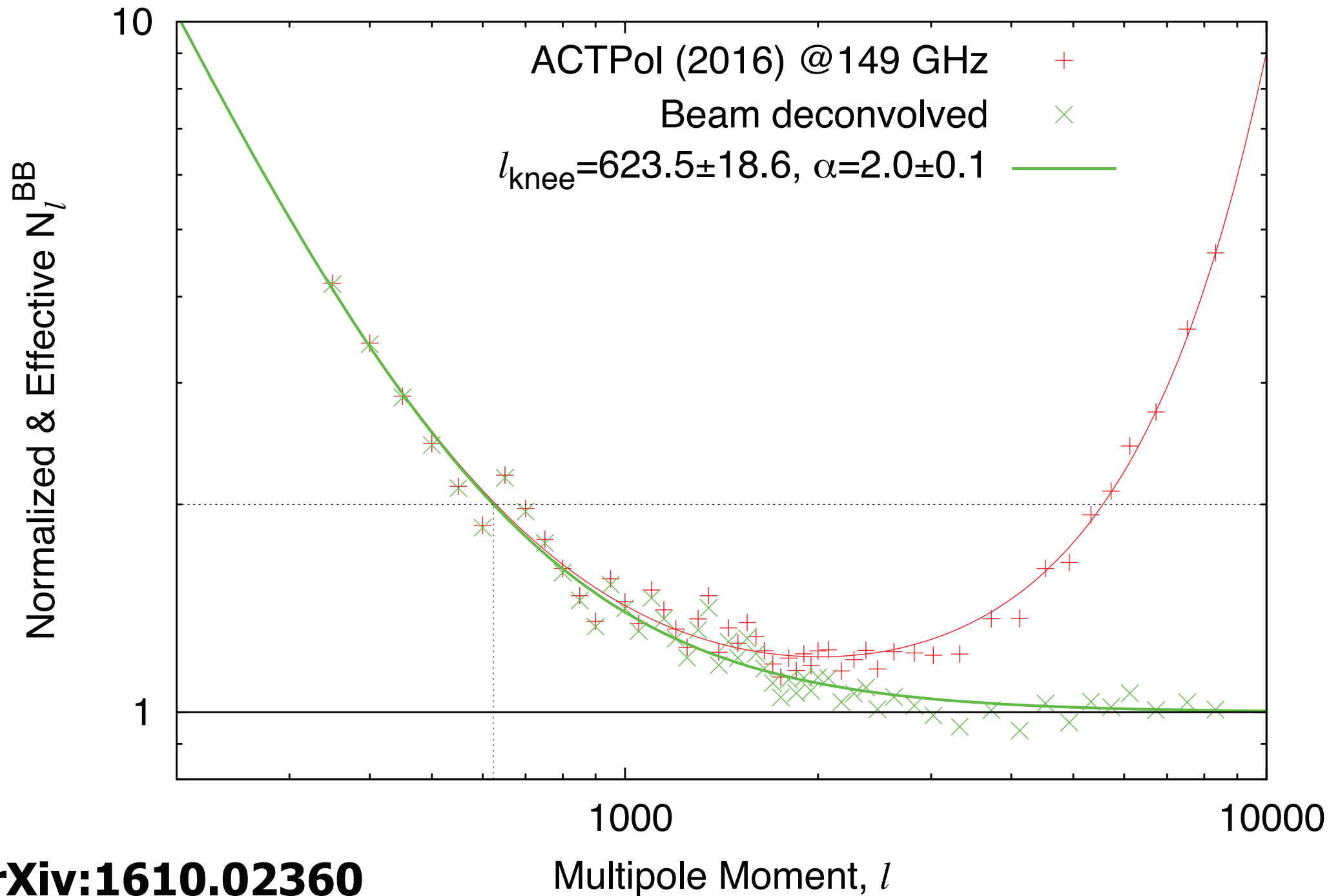
# QUIET W-band (95 GHz)



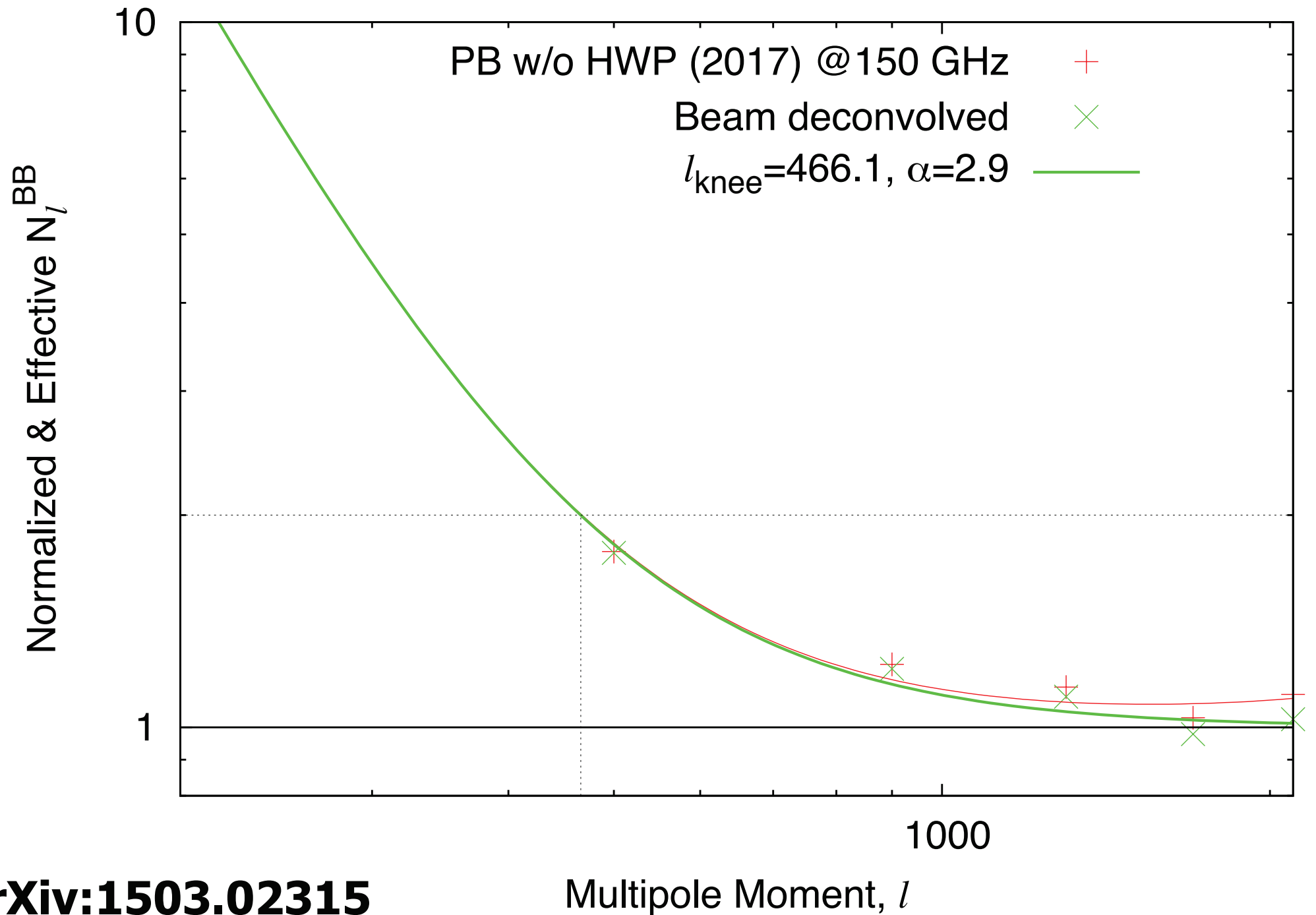
# QUIET Q-band (43 GHz)



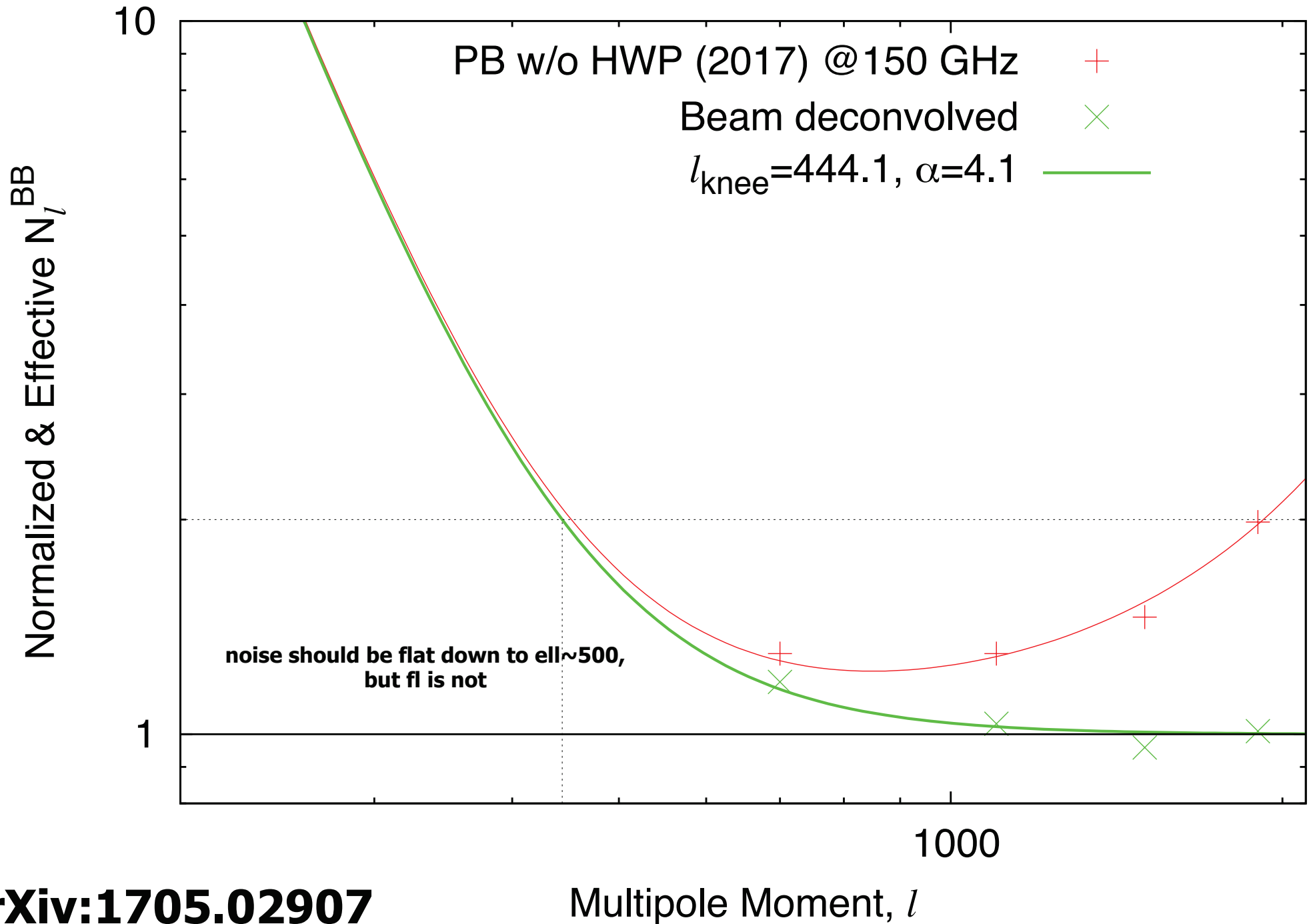
# ACTPol 149 GHz (2016)



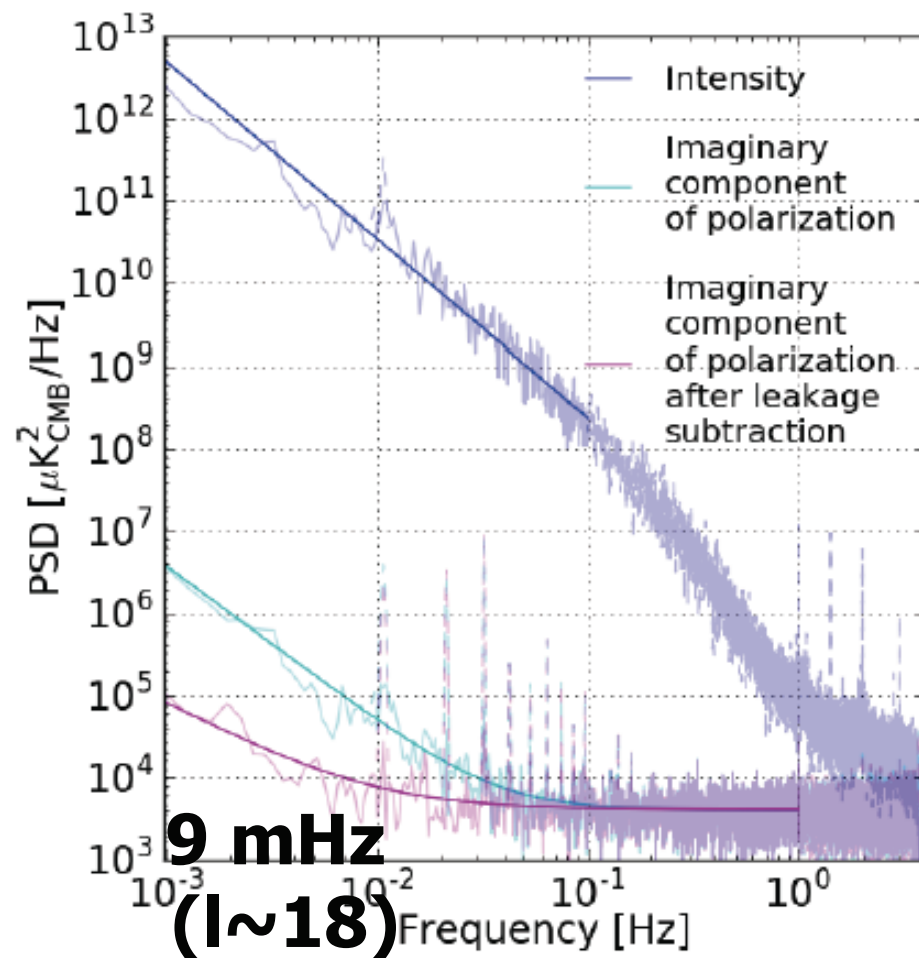
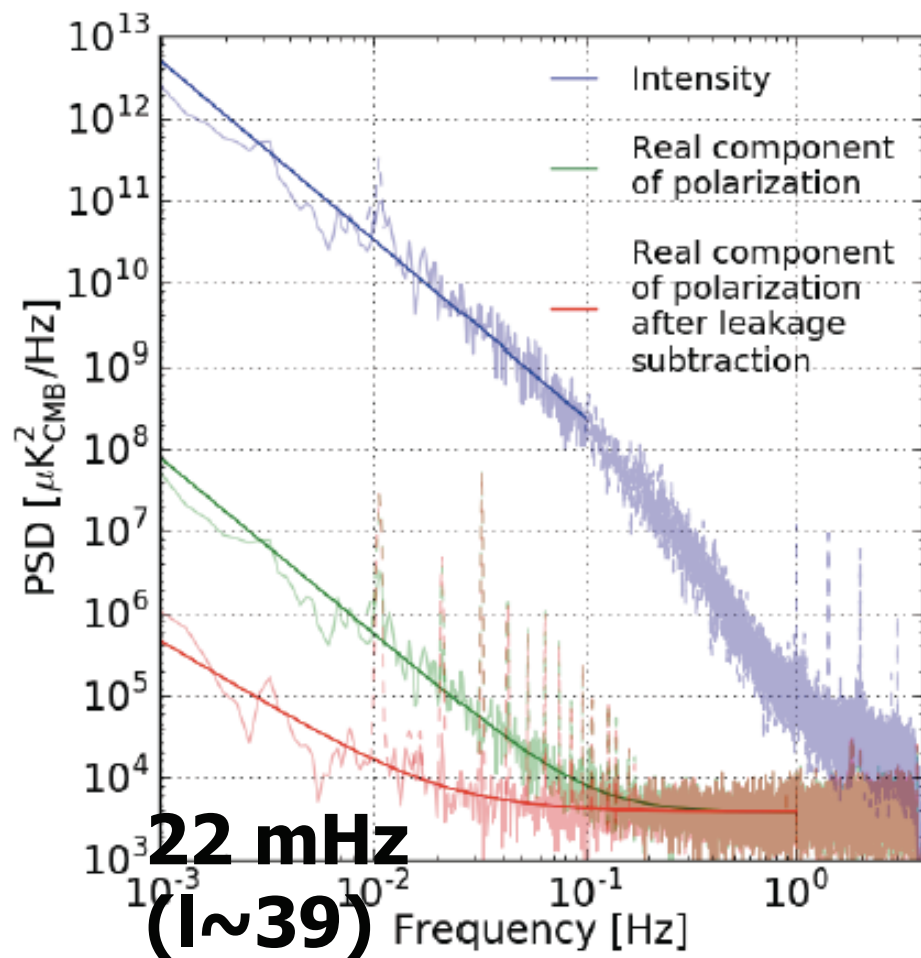




# POLARBEAR Small Patch w/o HWP 150 GHz (2017)



# POLARBEAR Large Patch w/ HWP



$$d'_{\bar{d}}(t) = \varepsilon[Q_{\text{in}}(t) + iU_{\text{in}}(t)] + A_{0|\langle I_{\text{in}} \rangle}^{(4)} + \lambda^{(4)}\delta I_{\text{in}}(t) + \mathcal{N}_{\bar{d}}^{(\text{Re})}(t) + i\mathcal{N}_{\bar{d}}^{(\text{Im})}(t),$$

with

$$\lambda^{(4)} \equiv \lambda_{\text{opt}}^{(4)} + 2g_1 A_{0|\langle I_{\text{in}} \rangle}^{(4)} + i\omega_{\text{mod}}\tau_1 A_{0|\langle I_{\text{in}} \rangle}^{(4)}.$$