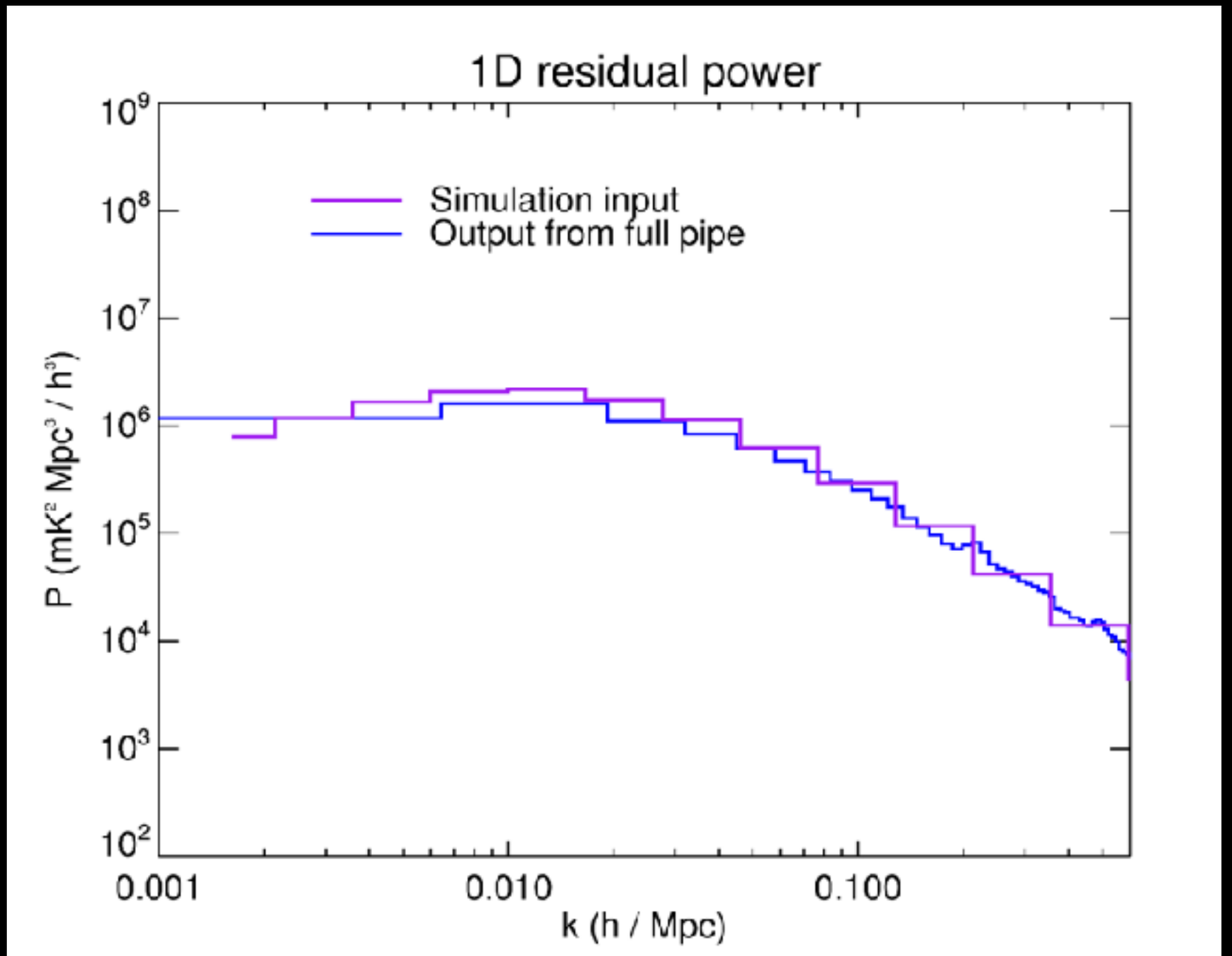
Building Confidence in EoR Limits

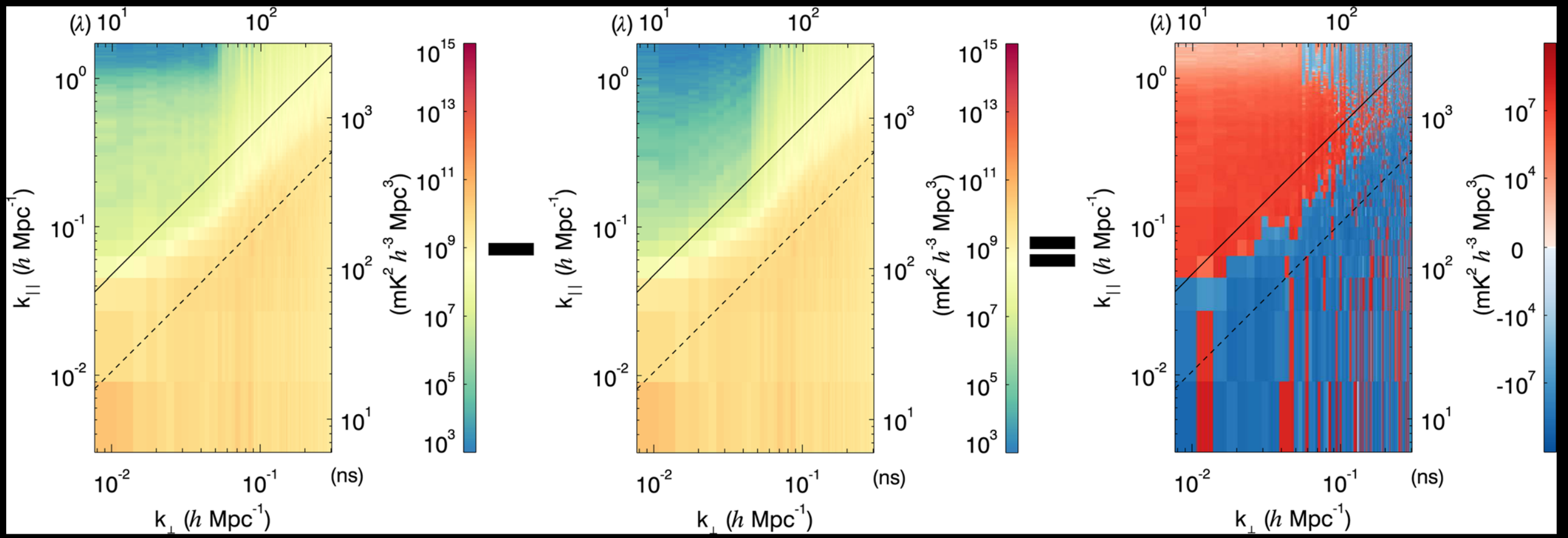
Miguel F. Morales

SALF IV, Sydney, Dec 14th 2017

End-to-end simulation: signal loss



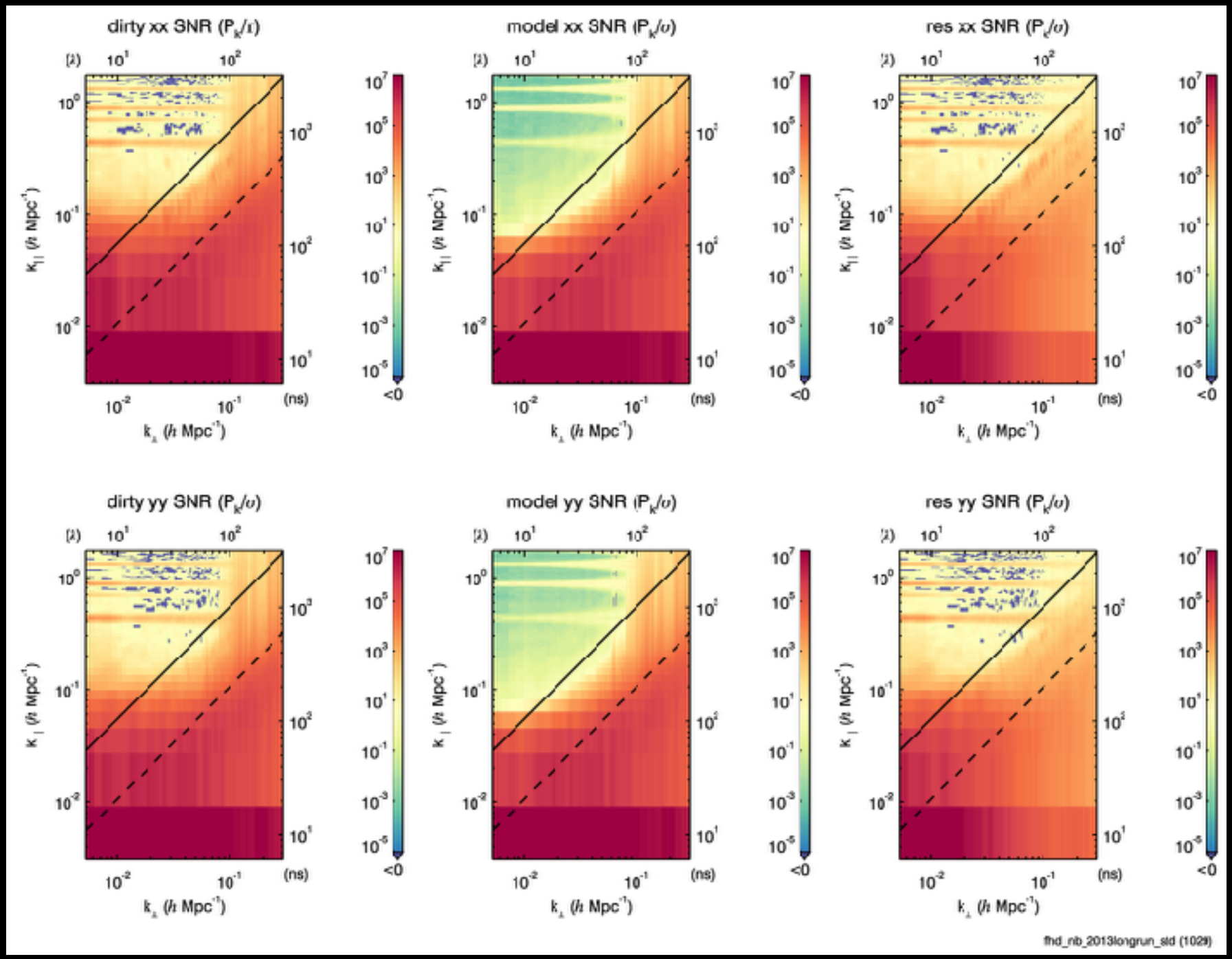
Including calibration with incomplete sky models



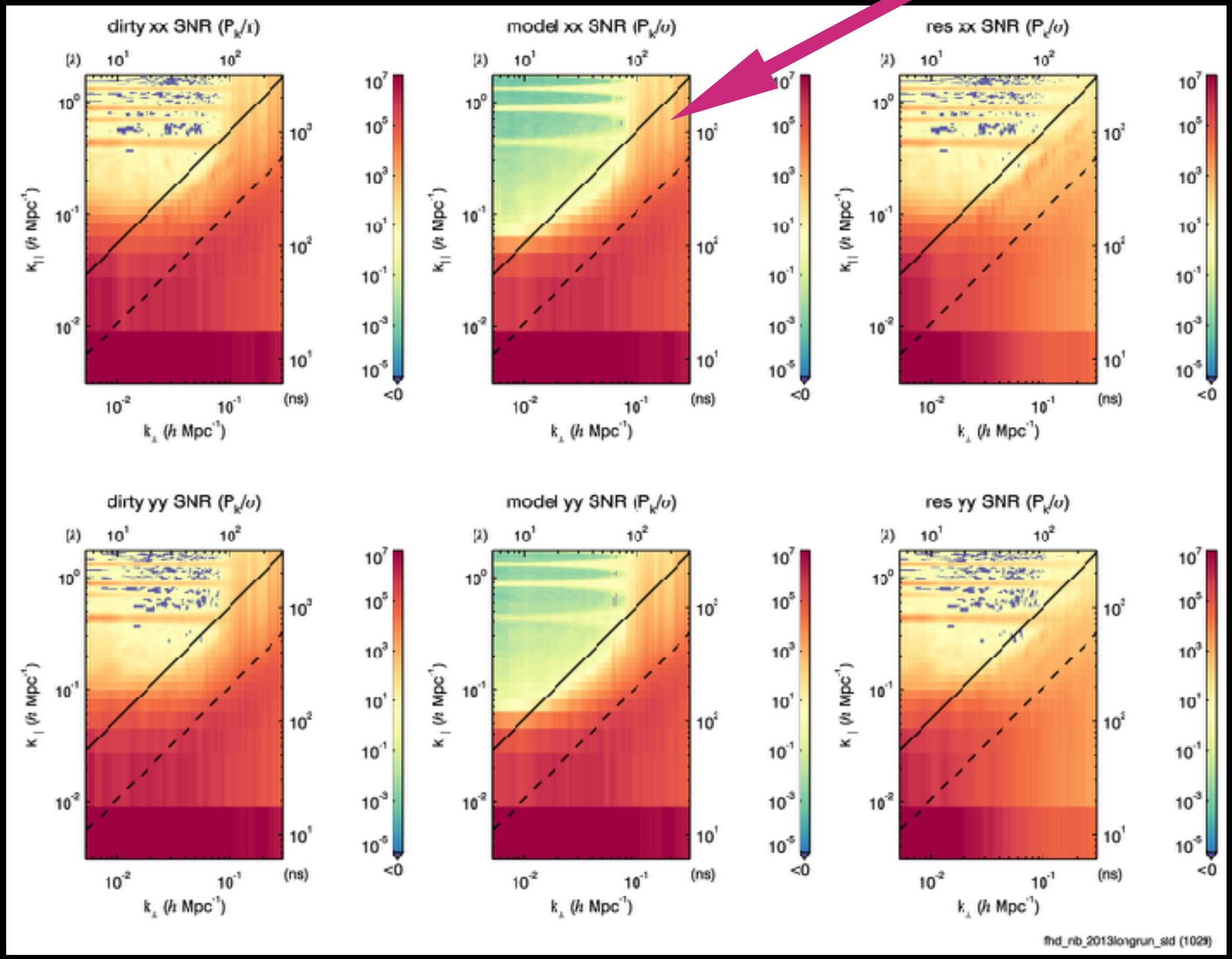
1

Barry et al. 2016

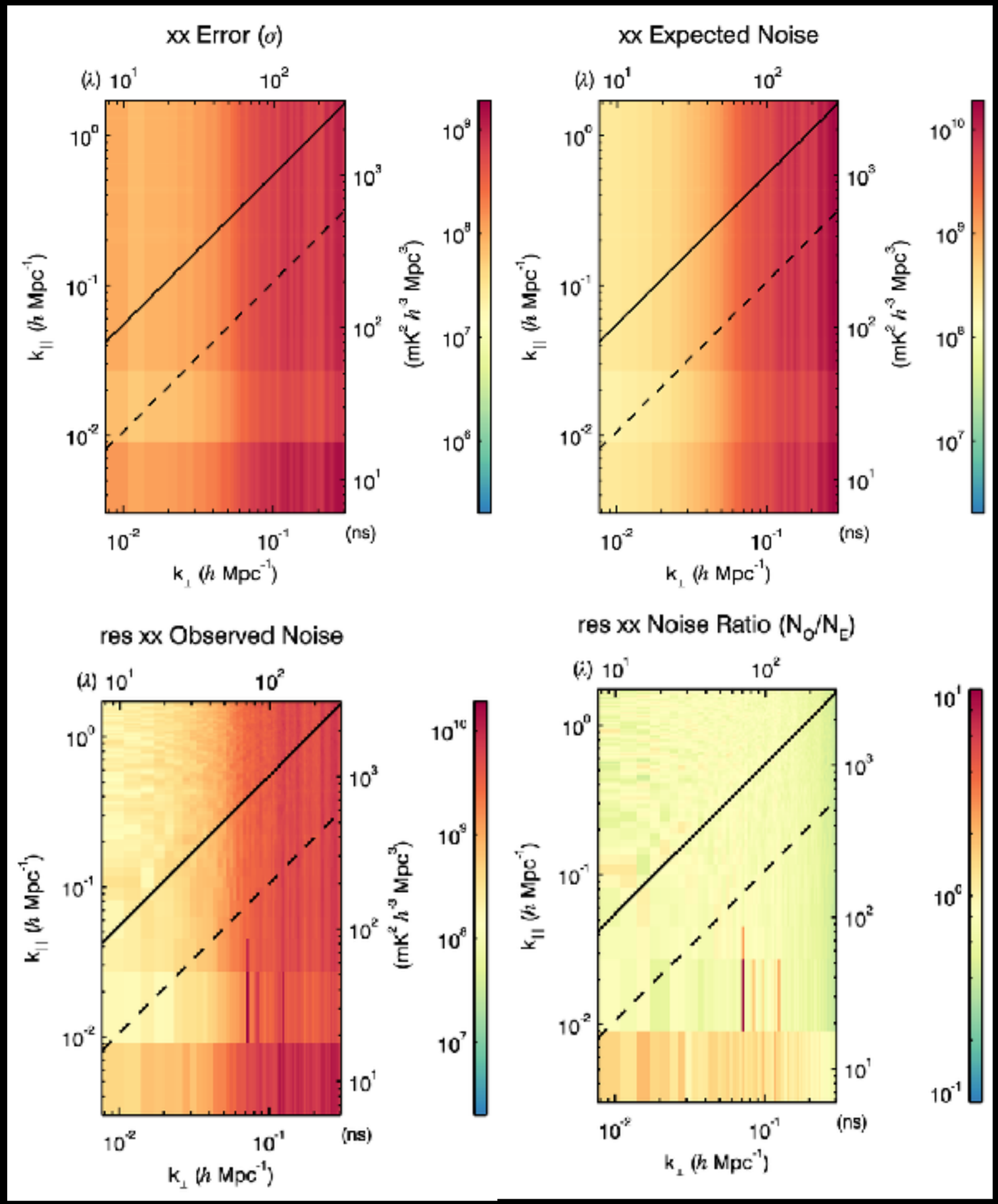
Matched observation ‘simulation’



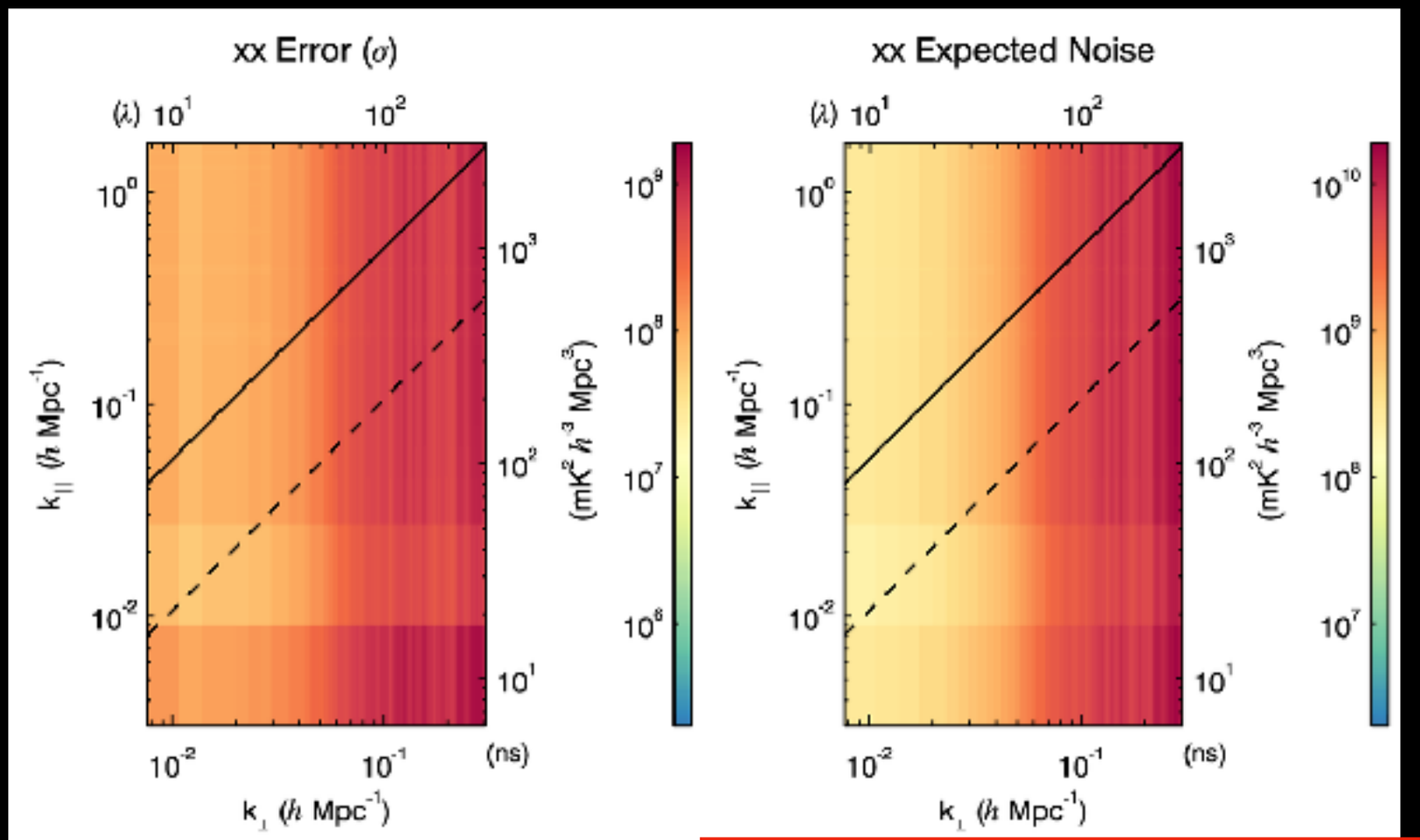
Matched observation ‘simulation’



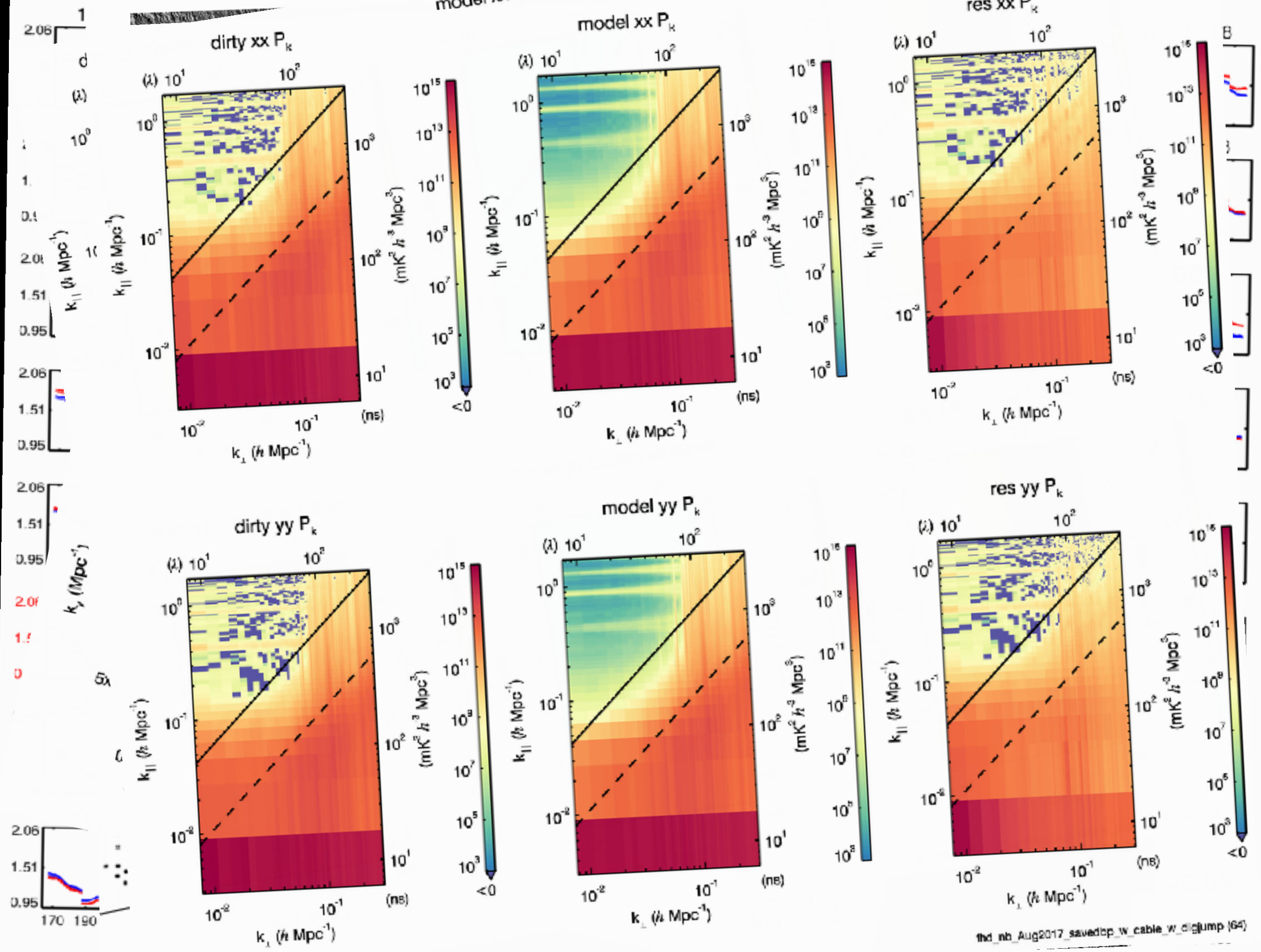
End-to-end error propagation



End-to-end error propagation



Diagnostic plots

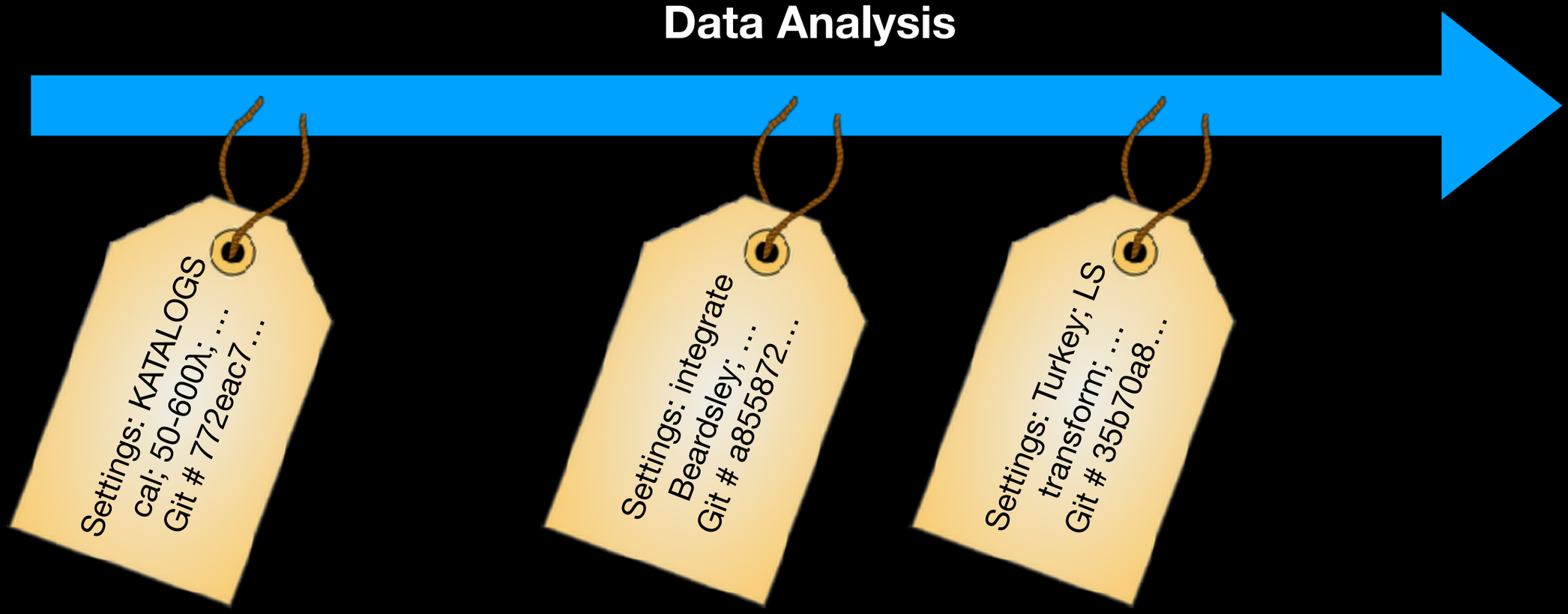

dirty xx P_k
model xx Observed Noise
model xx P_k
res xx Observed Noise
res xx P_k
dirty yy P_k
model yy P_k
res yy P_k
k_⊥ (h Mpc^-1)
k_|| (h Mpc^-1)
(mK^2 h^-3 Mpc^3)
(ns)
<0
thd_nb_Aug2017_savedbp_w_cable_w_digjump (64)

3


No RFI
RFI
13
3
7
7


NERD

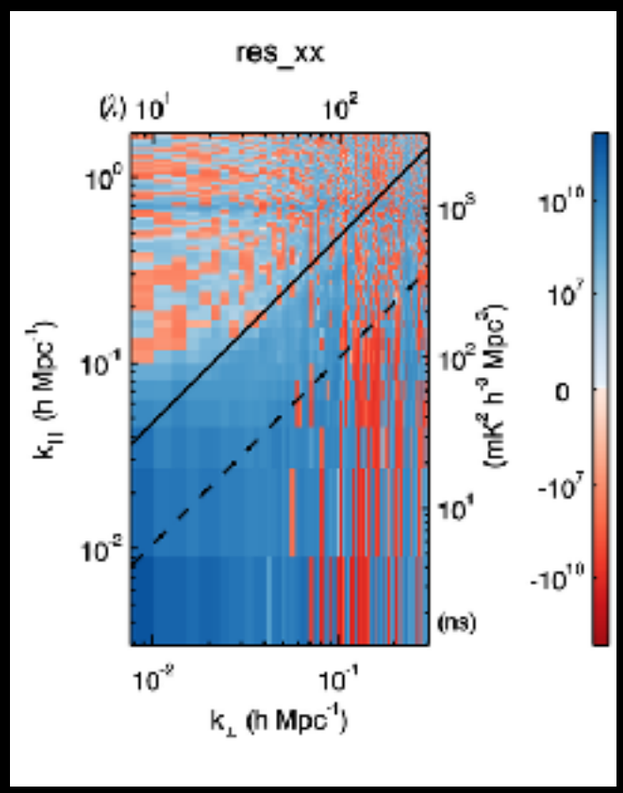
Analysis traceability



Data unit tests

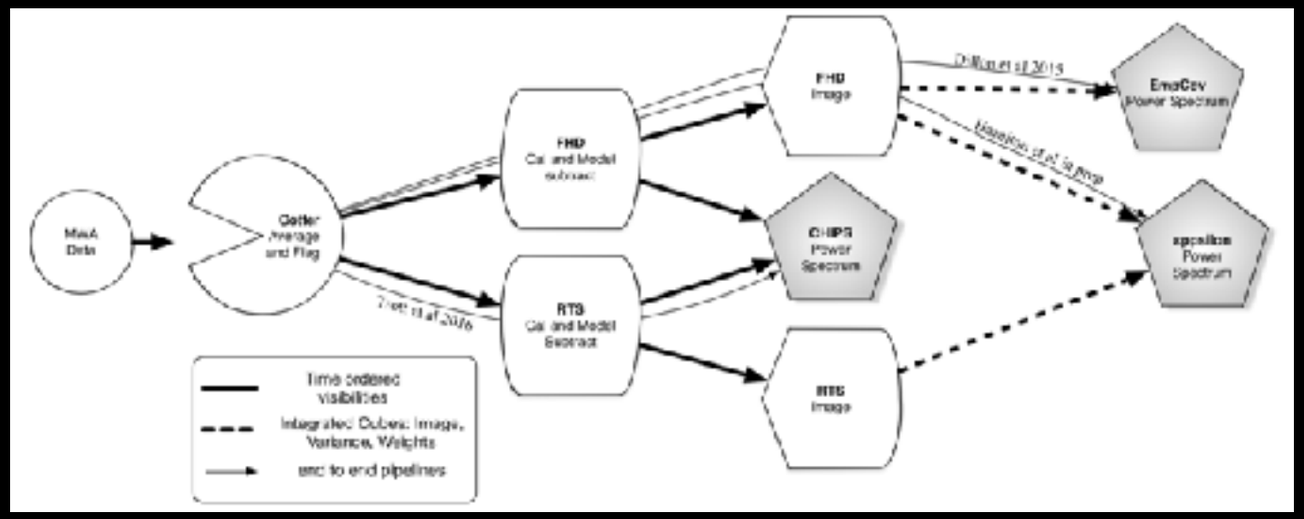
2 fhd_core/fhd_struct_init_antenna.pro — View

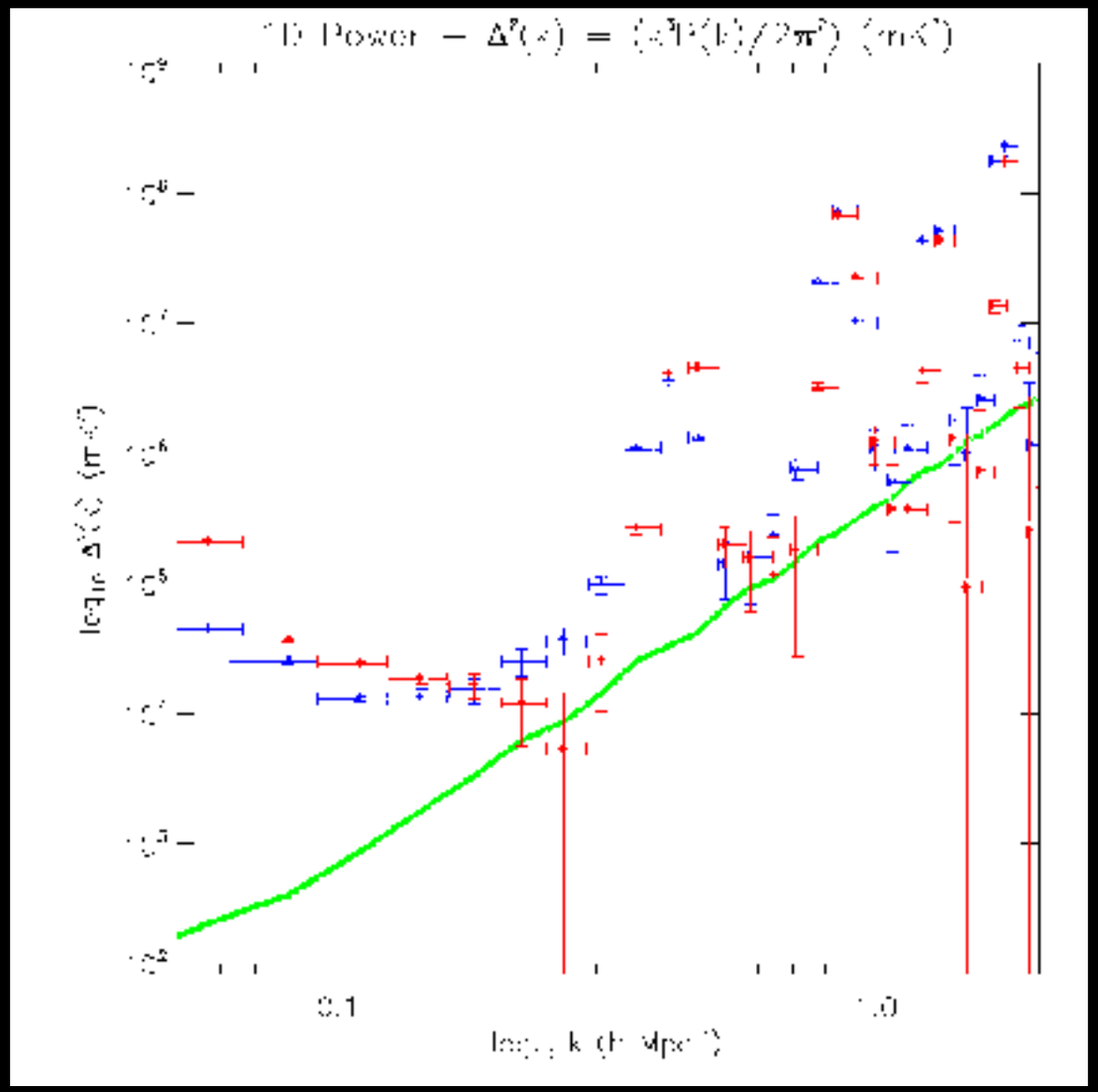
```
@@ -86,7 +86,7 @@ dec_use=dec_arr[valid_i]
 ;NOTE: Eq2Hor REQUIRES Jdate to have the same number of elements as RA and Dec for precession!!
 ;;NOTE: The NEW Eq2Hor REQUIRES Jdate to be a scalar! They created a new bug when they fixed the old one
-Eq2Hor,ra_use,dec_use,Jdate,alt_arr1,az_arr1,lat=obs.lat,lon=obs.lon,alt=obs.alt,precess=1
+Eq2Hor,ra_use,dec_use,Jdate,alt_arr1,az_arr1,lat=obs.lat,lon=obs.lon,alt=obs.alt,precess=1,/nutate
 za_arr=fltarr(psf_image_dim,psf_image_dim)+90. & za_arr[valid_i]=90.-alt_arr1
 az_arr=fltarr(psf_image_dim,psf_image_dim) & az_arr[valid_i]=az_arr1
```



Hazelton

Parallel pipelines

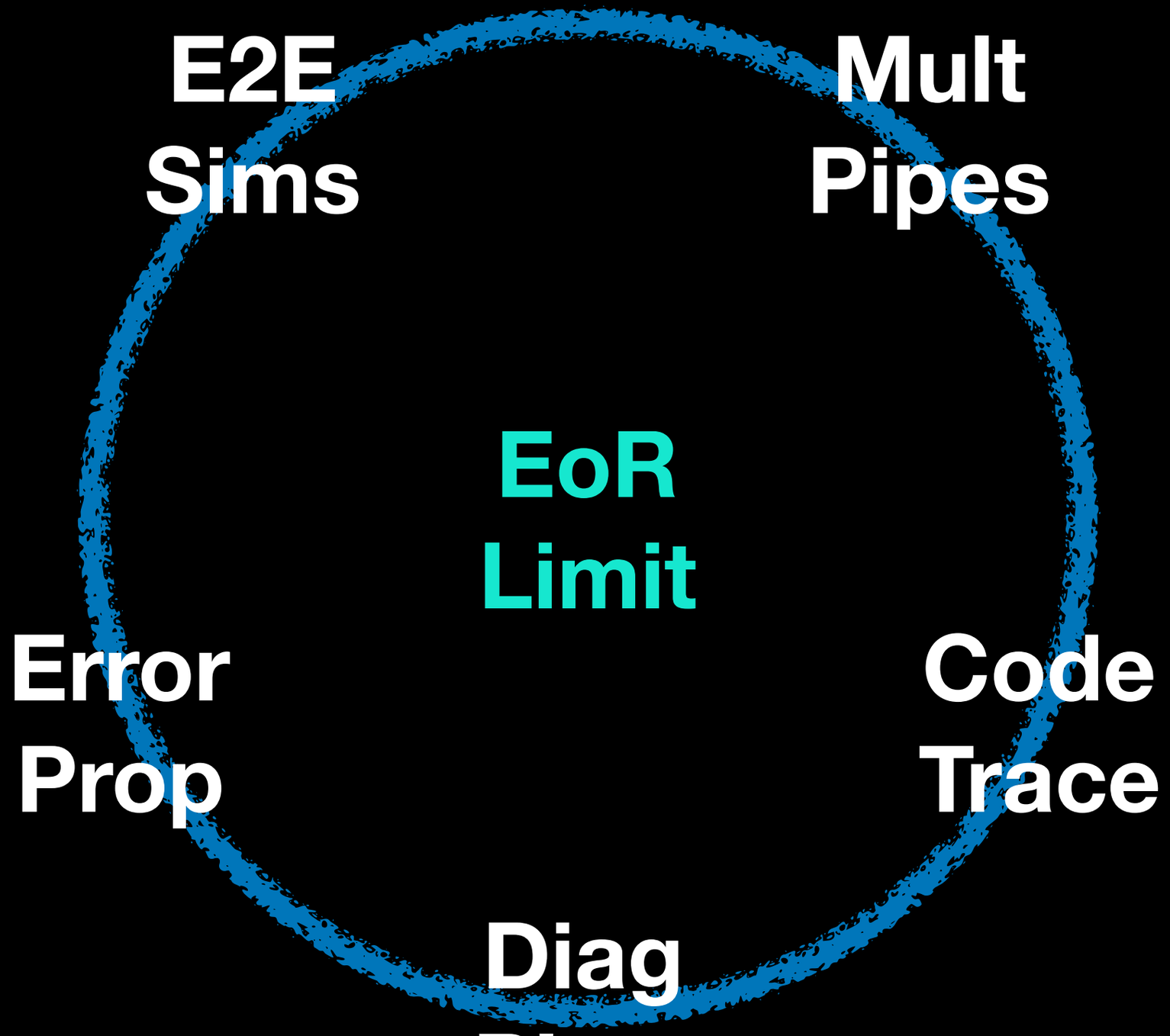




Jacobs et al. 2016

Trott

Protecting a limit



If you're interested in our techniques…

- All code is freely available: https://github.com/EoRImaging
- email me about our FHD/eppsilon workshop in 2018
  miguelfm@uw.edu