# FAST HI IM

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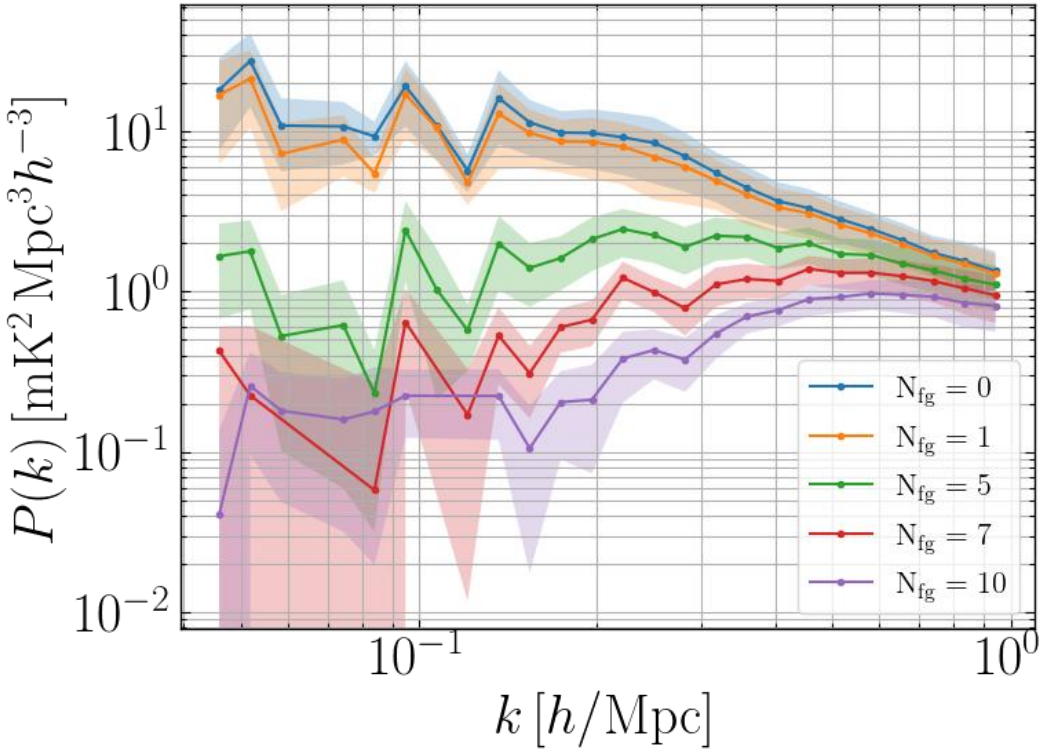
# transfer function

- 10 mock maps by *powerbox*
- $M_{HI}$, $M_g$

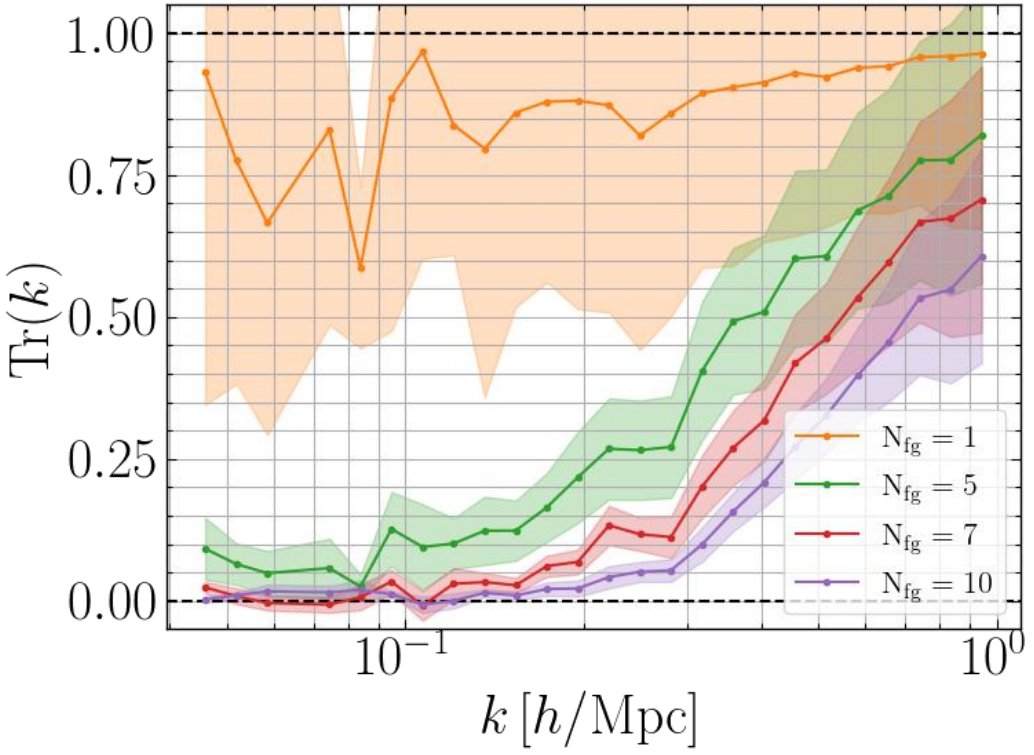
- $M_c = [M_{HI} + X_{obs}]_{PCA} - [X_{obs}]_{PCA}$
- $Tr_{HI} = P(M_c, M_{HI}) / P(M_{HI}, M_{HI})$
- $Tr_x = P(M_c, M_g) / P(M_{HI}, M_g)$

# transfer function - clean x HI

- $M_c = [M_{HI} + X_{obs}]_{PCA} - [X_{obs}]_{PCA}$
- $Tr_{HI} = P(M_c, M_{HI}) / P(M_{HI}, M_{HI})$



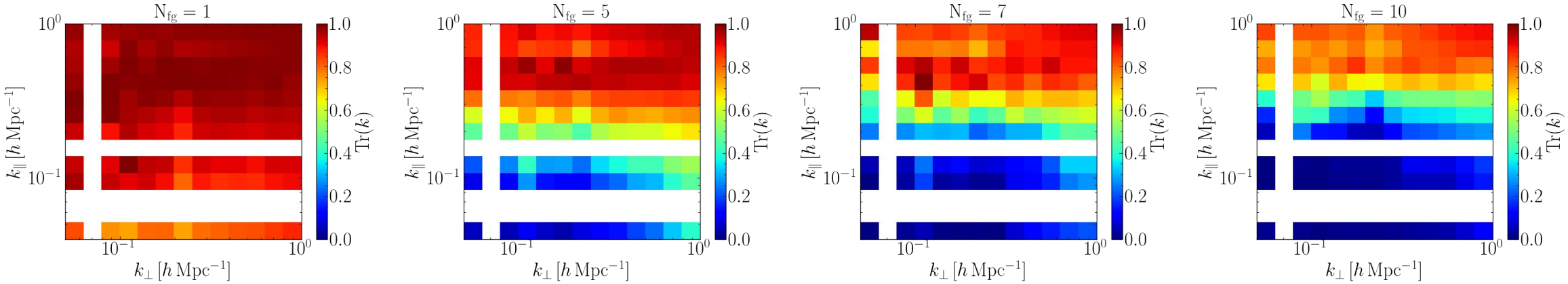

$P(M_c, M_{HI})$




$Tr_{HI}$

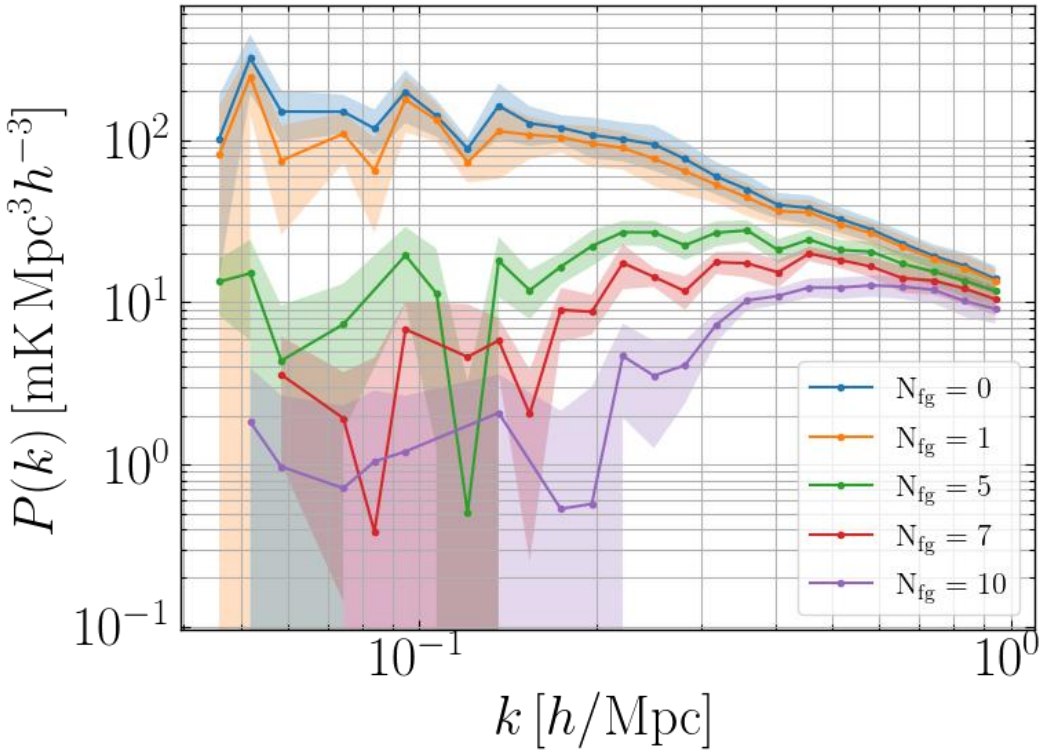
# transfer function - clean x HI

- $M_c = [M_{HI} + X_{obs}]_{PCA} - [X_{obs}]_{PCA}$
- $Tr_{HI} = P(M_c, M_{HI}) / P(M_{HI}, M_{HI})$

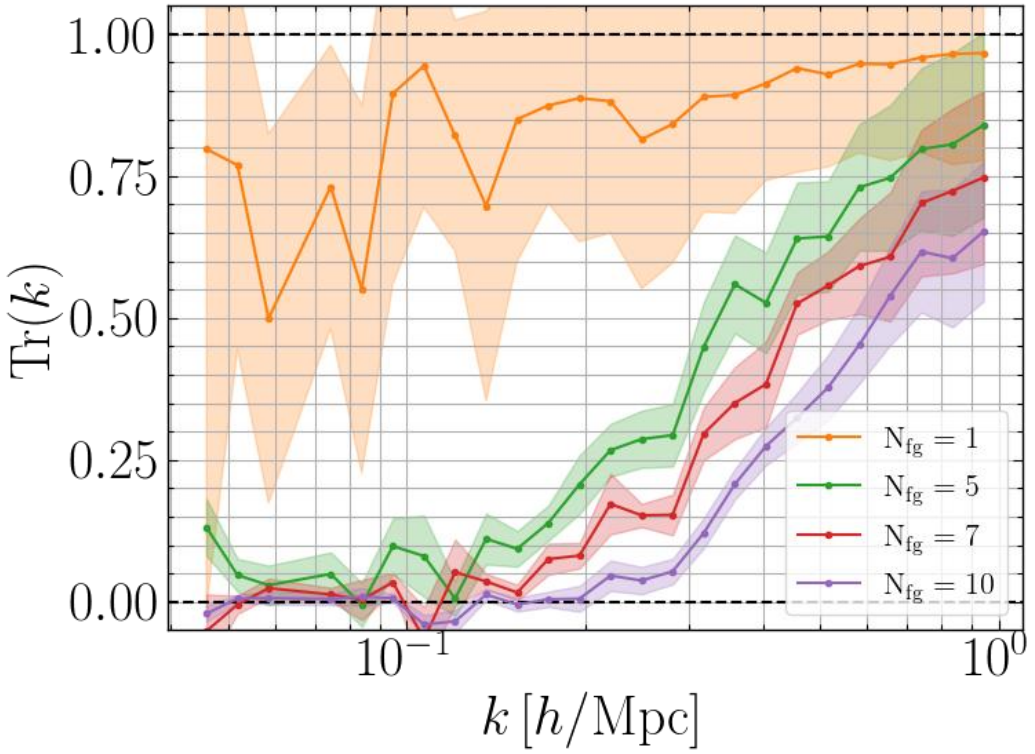


# transfer function - clean x gal

- $M_c = [M_{HI} + X_{obs}]_{PCA} - [X_{obs}]_{PCA}$
- $Tr_x = P(M_c, M_g) / P(M_{HI}, M_g)$



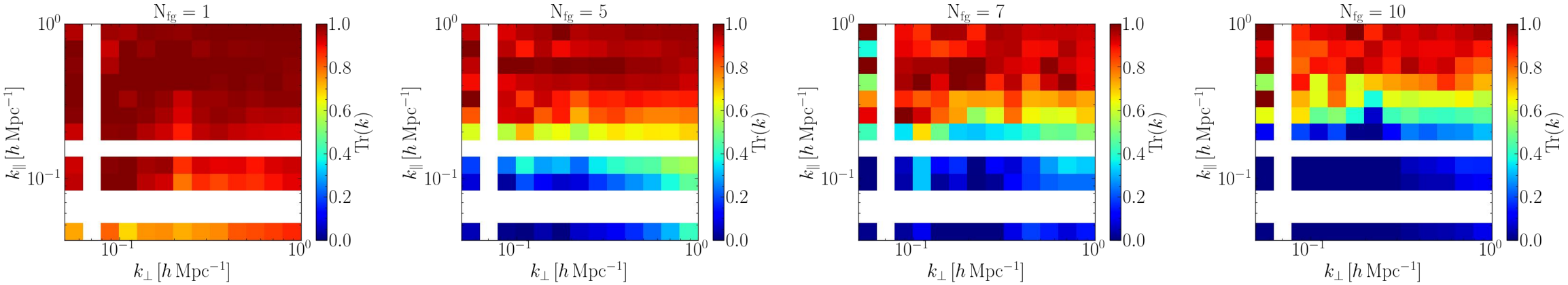

$P(M_c, M_g)$




$Tr_x$

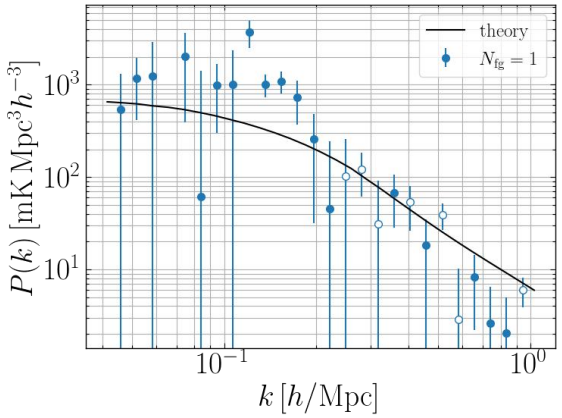
# transfer function - clean x gal

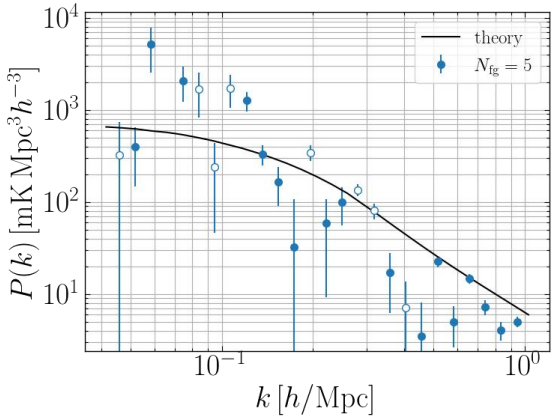
- $M_c = [M_{HI} + X_{obs}]_{PCA} - [X_{obs}]_{PCA}$
- $Tr_x = P(M_c, M_g) / P(M_{HI}, M_g)$

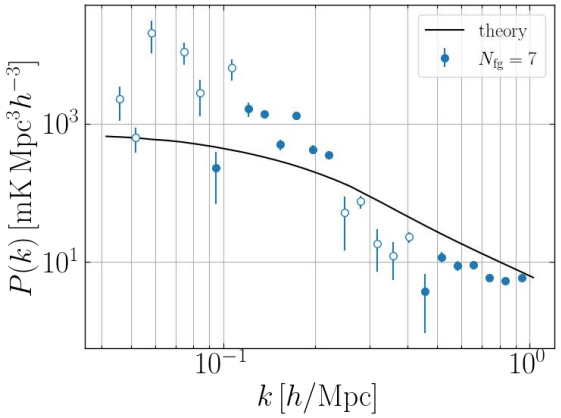


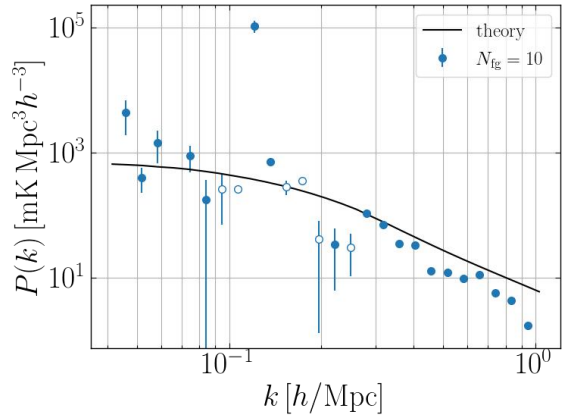
# corrected ps - cross ps

- $Tr_{HI}$ corrected

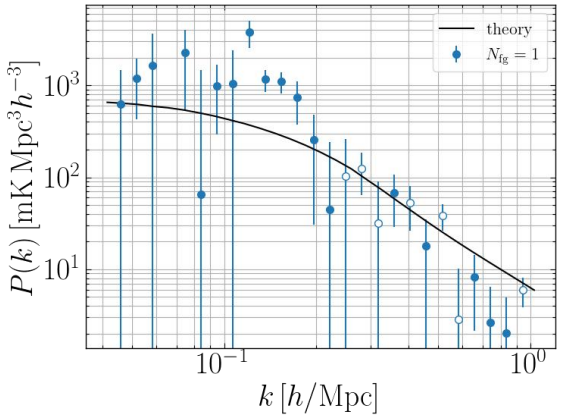


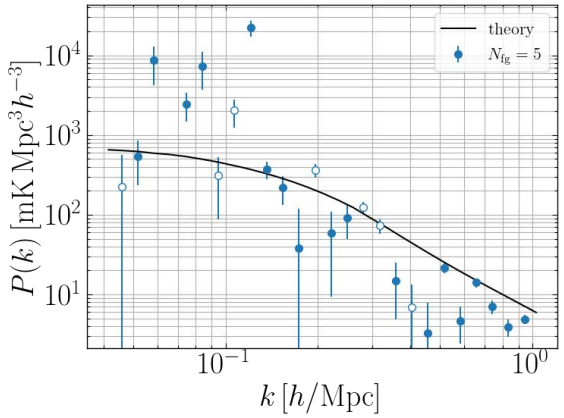



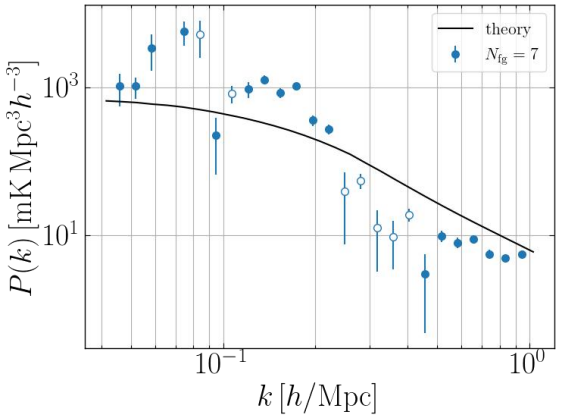



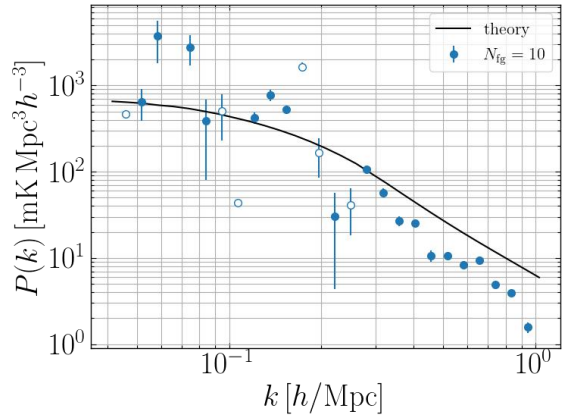




- $Tr_x$ corrected



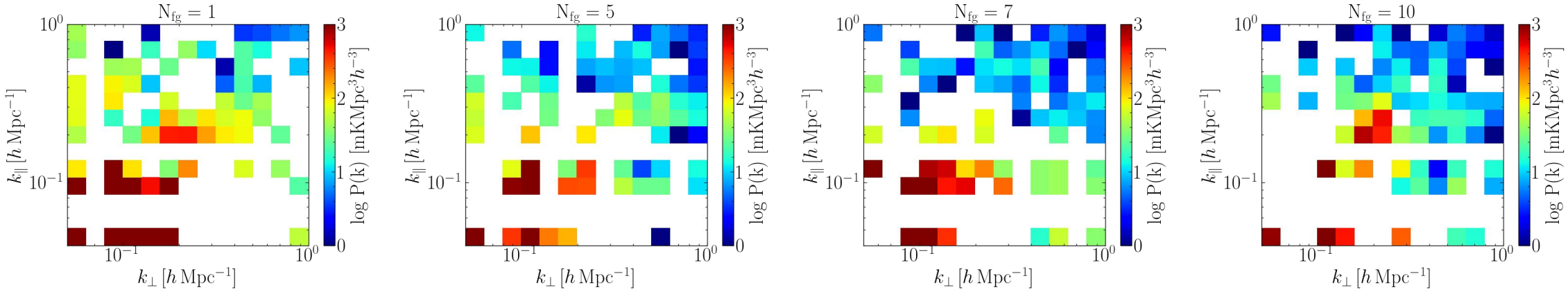



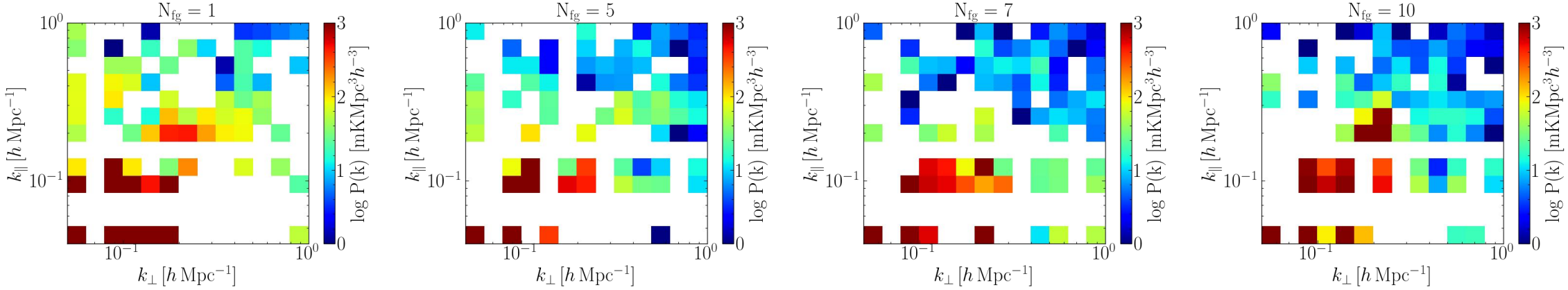



# corrected ps - cross ps

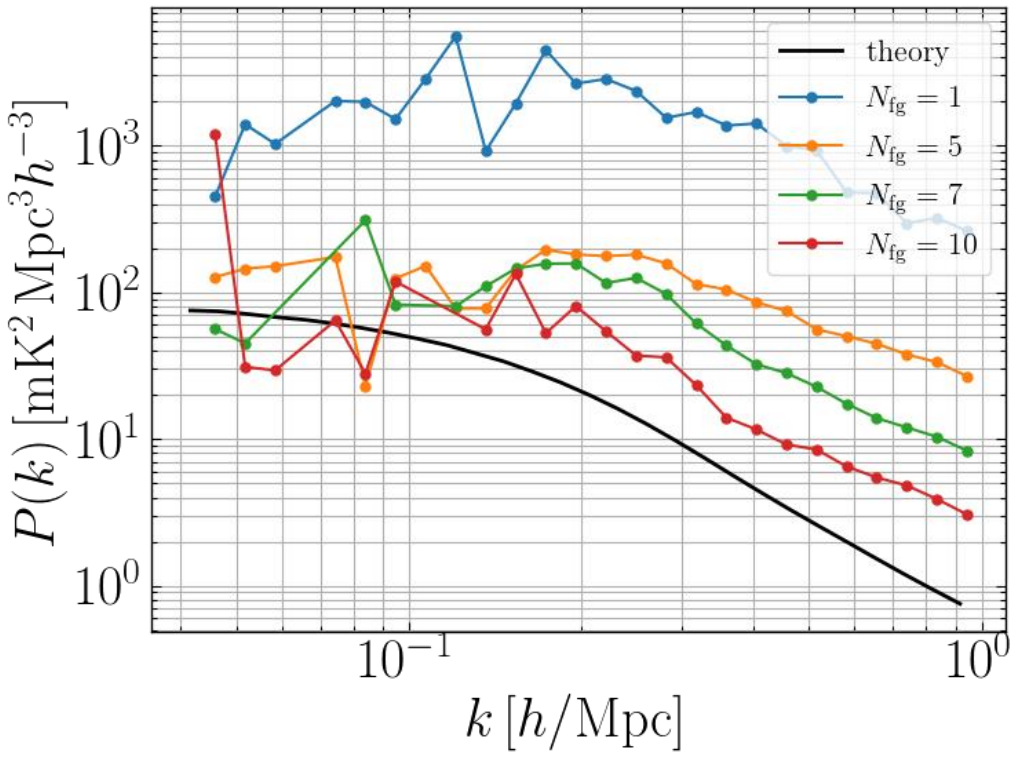
- $Tr_{HI}$ corrected

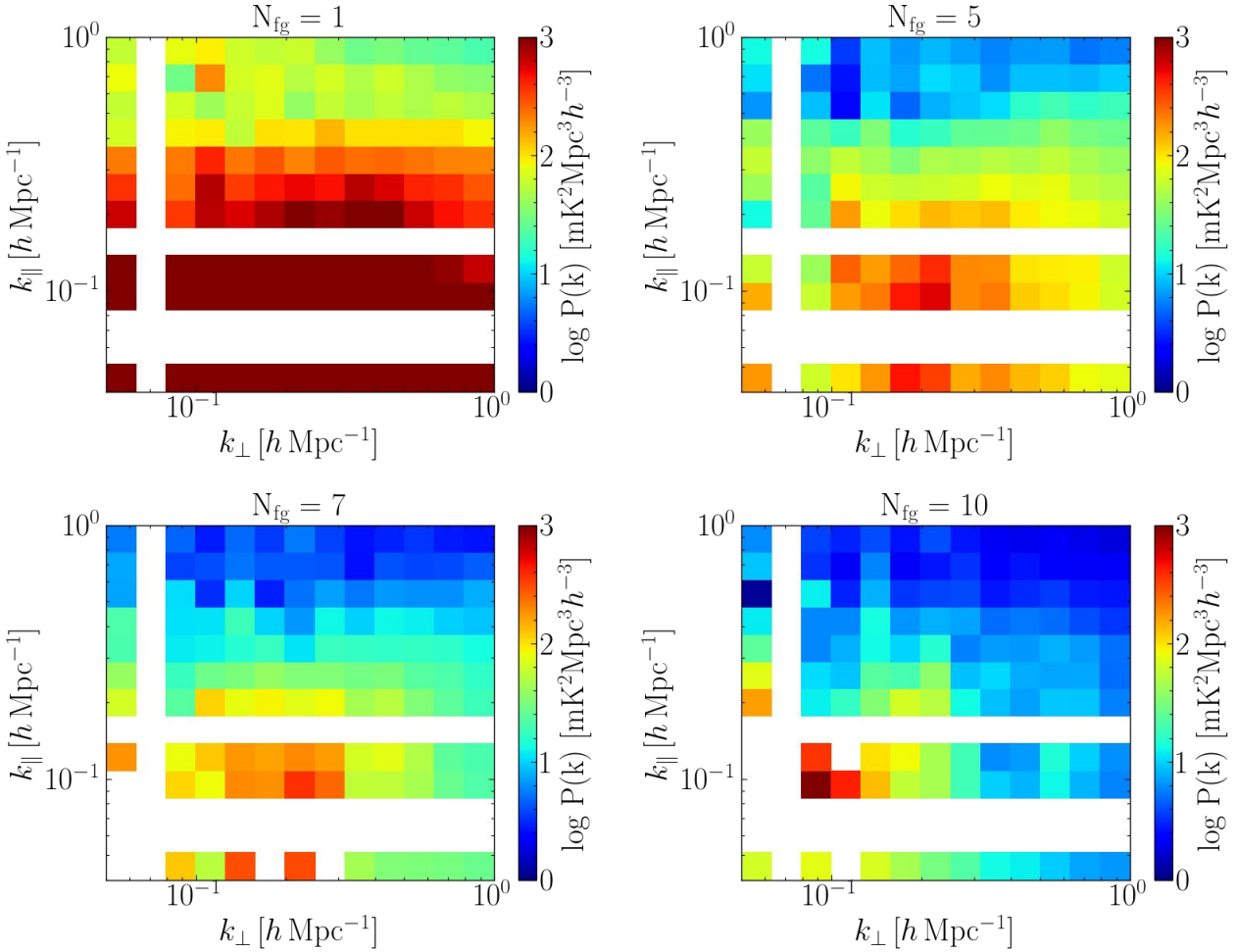



- $Tr_x$ corrected



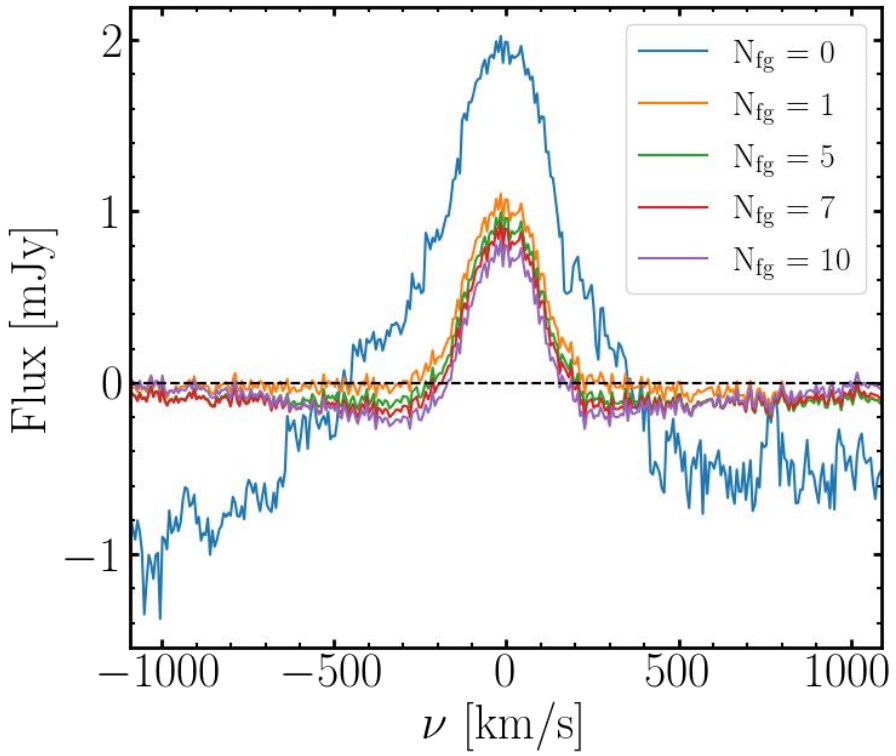
# corrected ps - HI auto ps



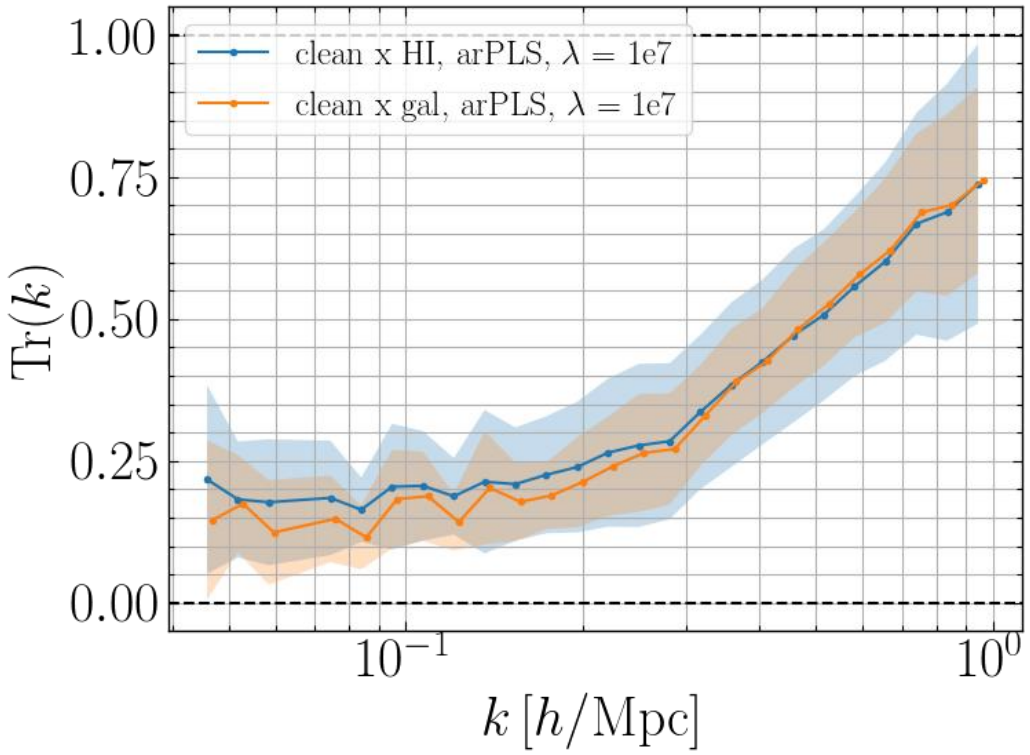
# HI emissions stacking

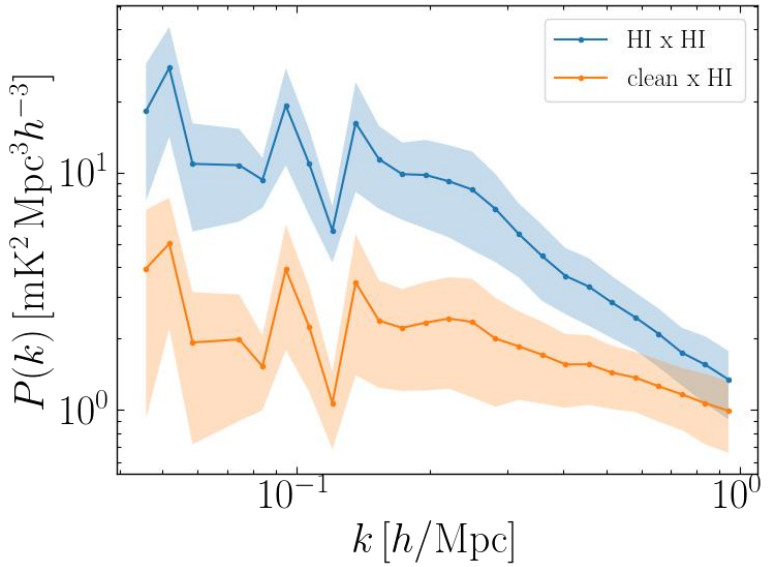
- 1950 galaxies from optical catalog

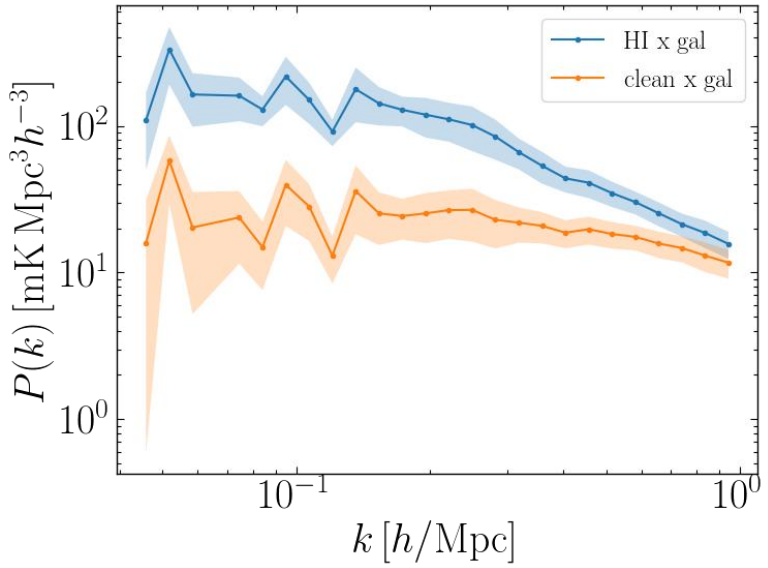


# transfer function

- **arPLS** (asymmetrically reweighted Penalized Least Squares)
- $M_c = [M_{HI} + X_{obs}]_{arpls} - [X_{obs}]_{arpls}$
- $Tr_{HI} = P(M_c, M_{HI}) / P(M_{HI}, M_{HI})$
- $Tr_x = P(M_c, M_g) / P(M_{HI}, M_g)$

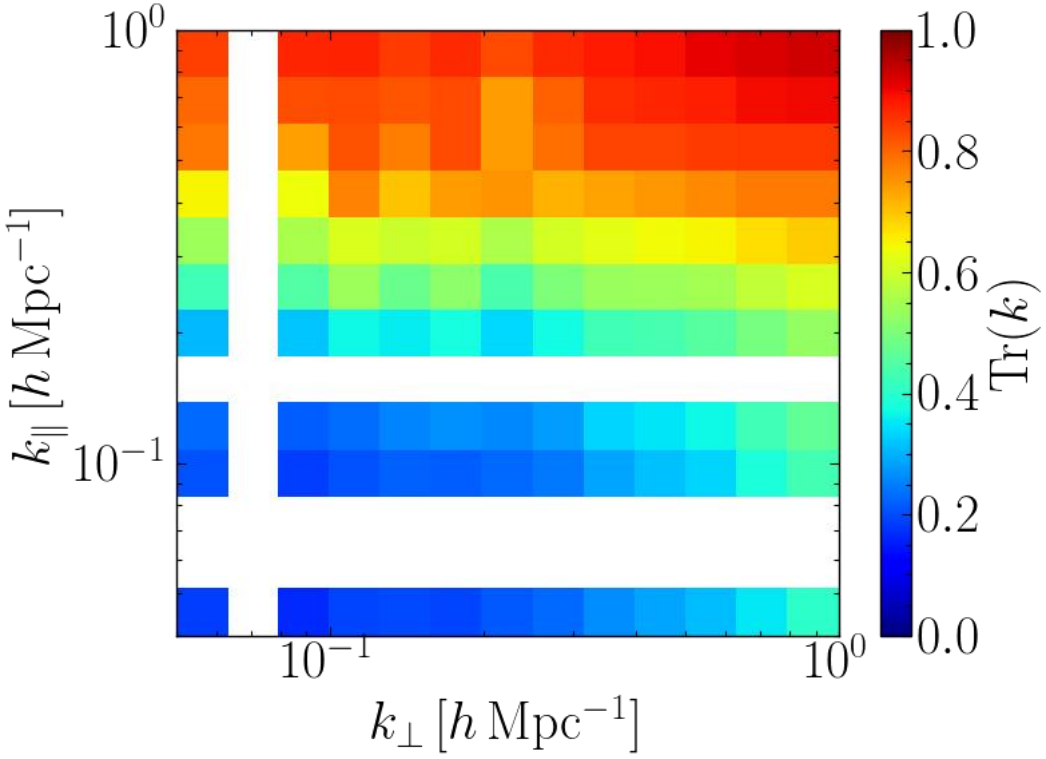


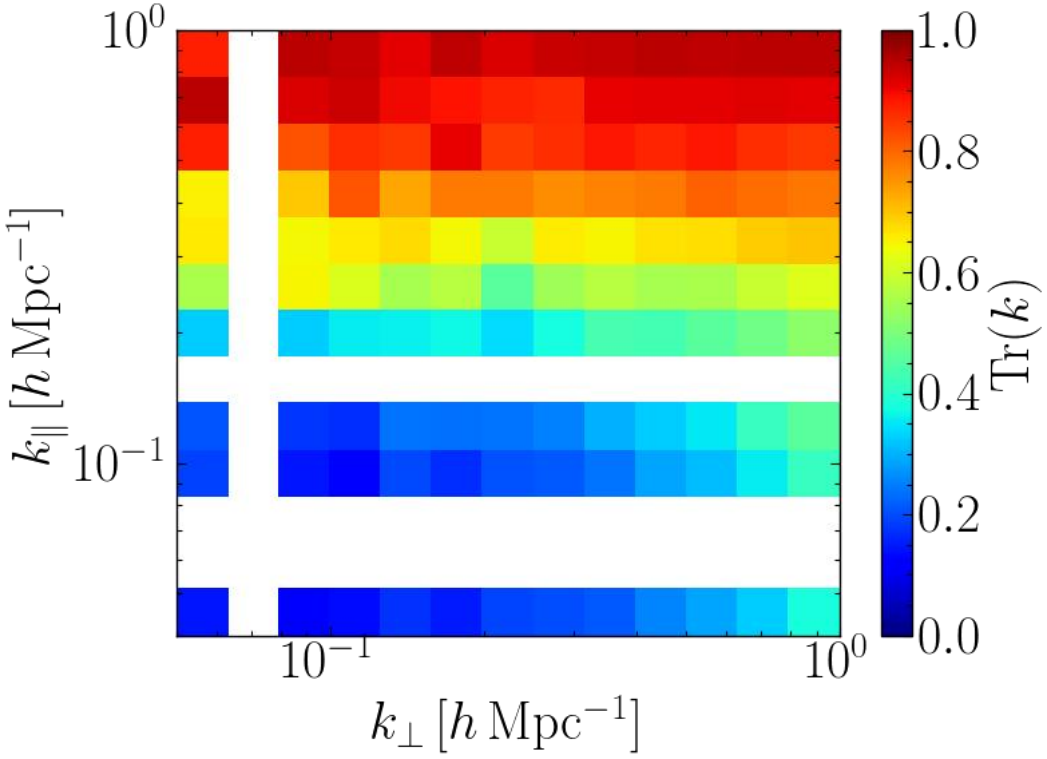



# transfer function

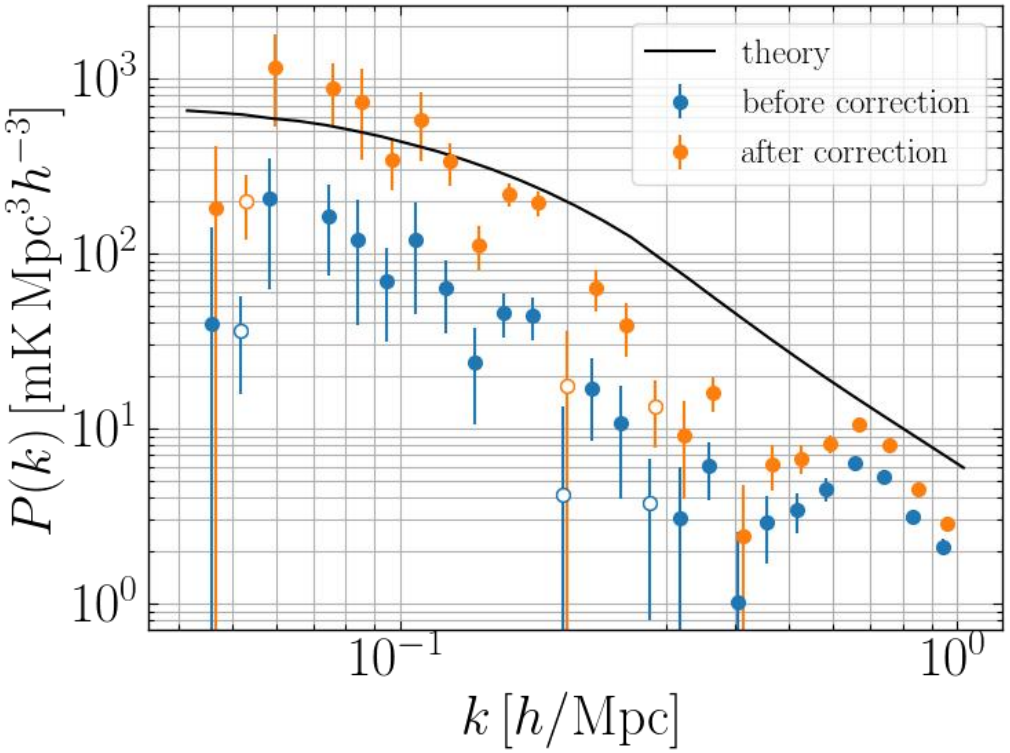
- $M_c = [M_{HI} + X_{obs}]_{arpls} - [X_{obs}]_{arpls}$
- $Tr_{HI} = P(M_c, M_{HI}) / P(M_{HI}, M_{HI})$ $\quad Tr_x = P(M_c, M_g) / P(M_{HI}, M_g)$



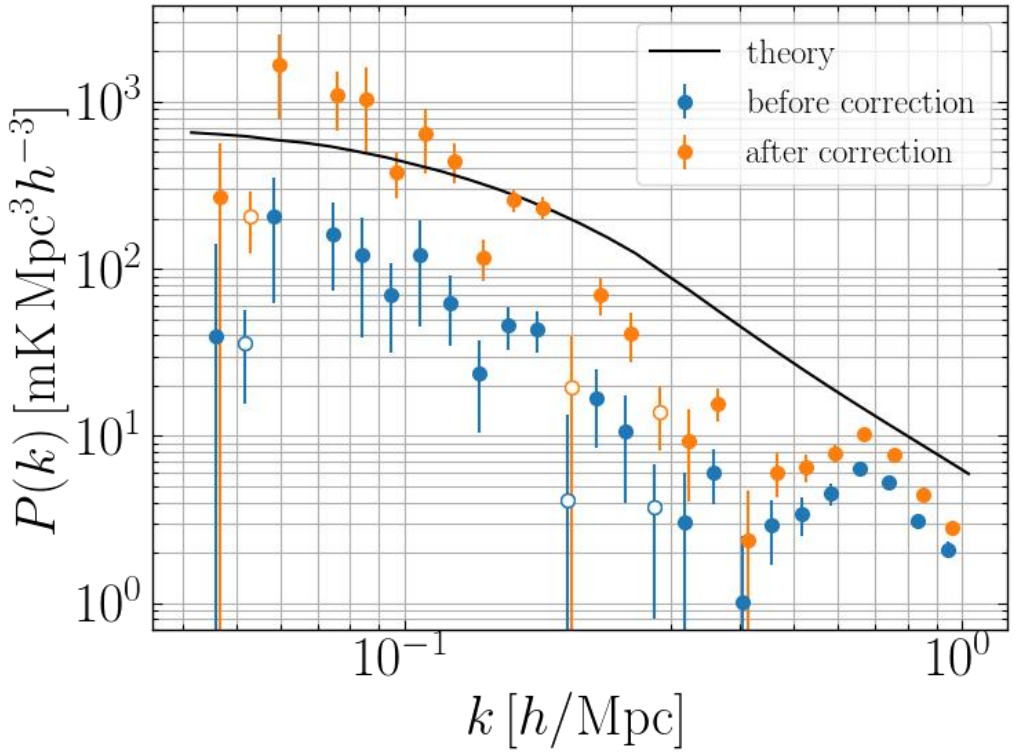



# corrected ps - cross ps

- 1D cross ps



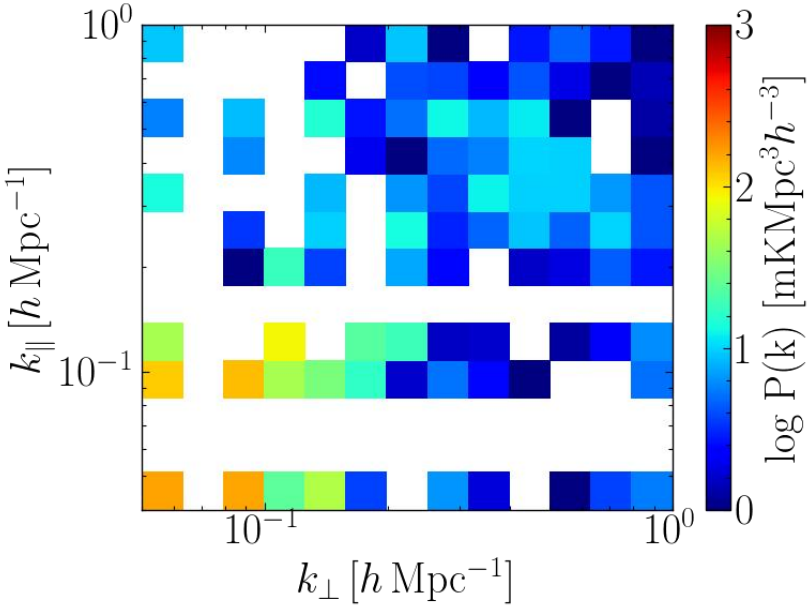

$Tr_{HI}$ corrected



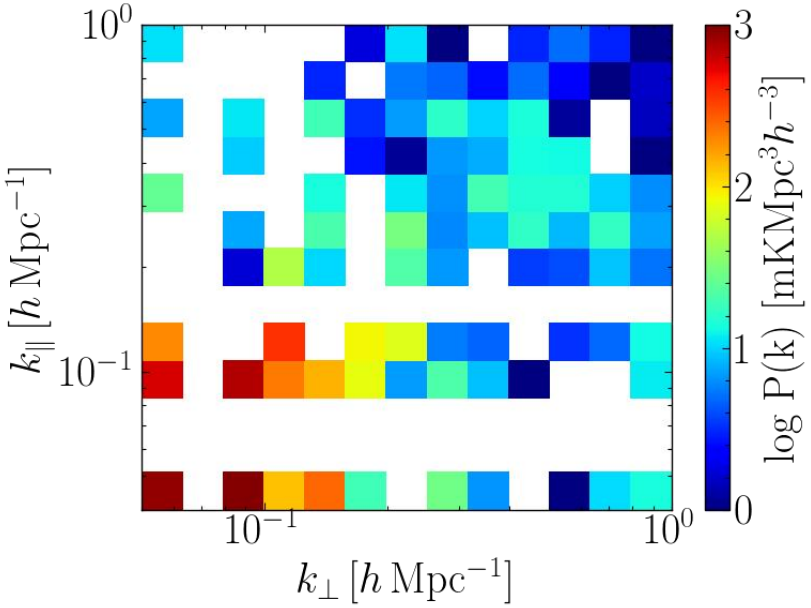

$Tr_x$ corrected

# corrected ps - cross ps

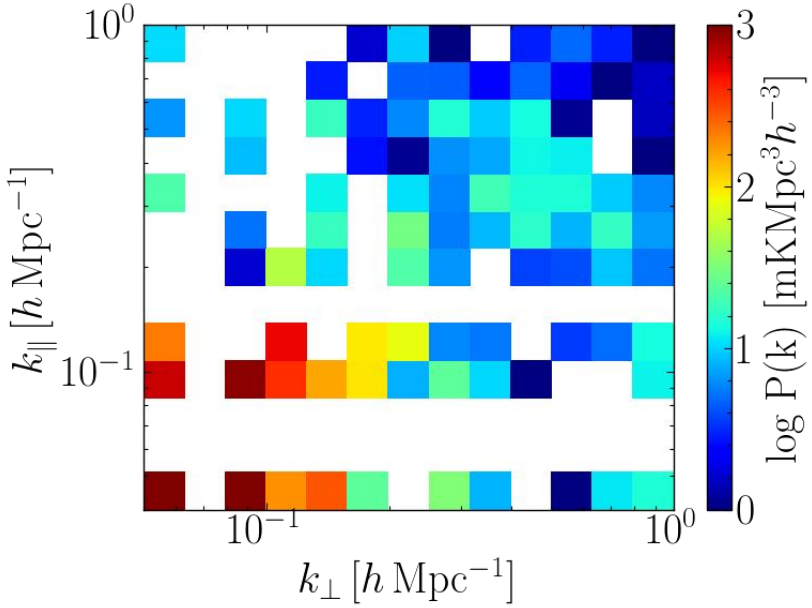
- 2D cross ps




2D $P_{HI,gal}$ before correction



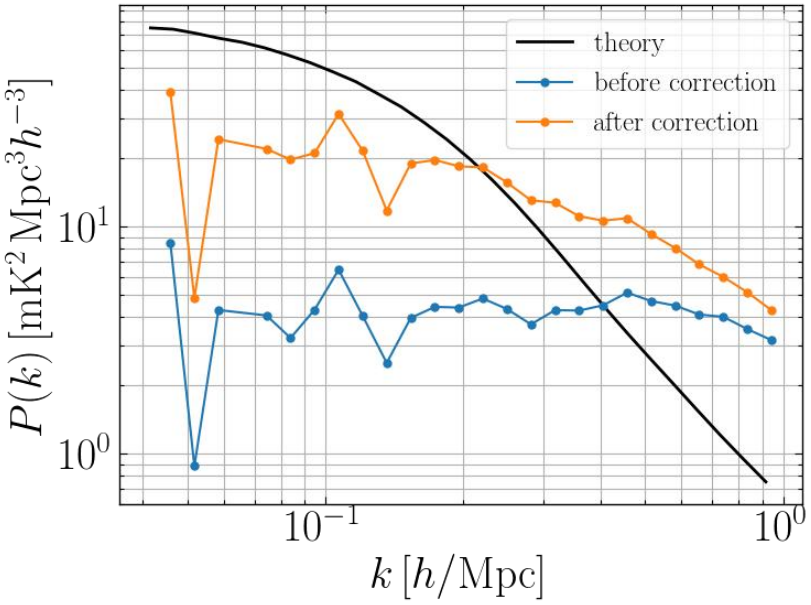

$Tr_{HI}$ corrected 2D $P_{HI,gal}$



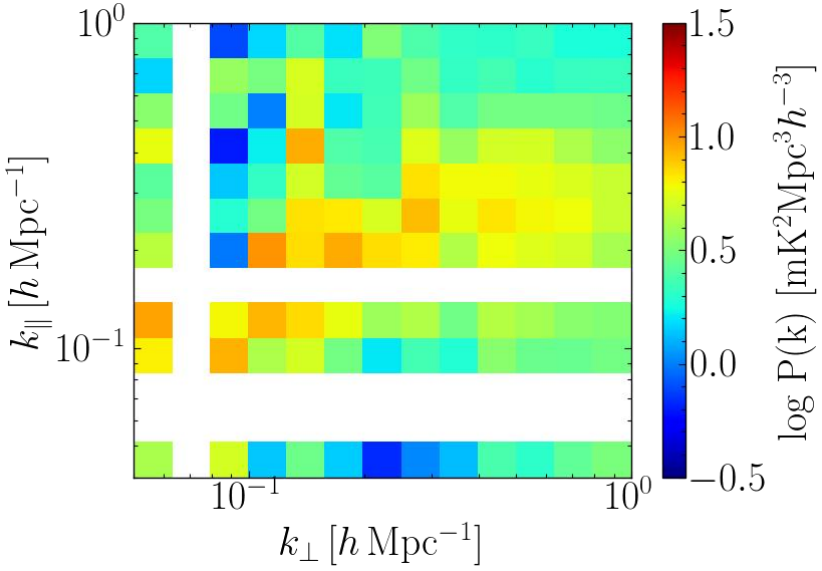

$Tr_x$ corrected 2D $P_{HI,gal}$

# corrected ps - HI auto ps

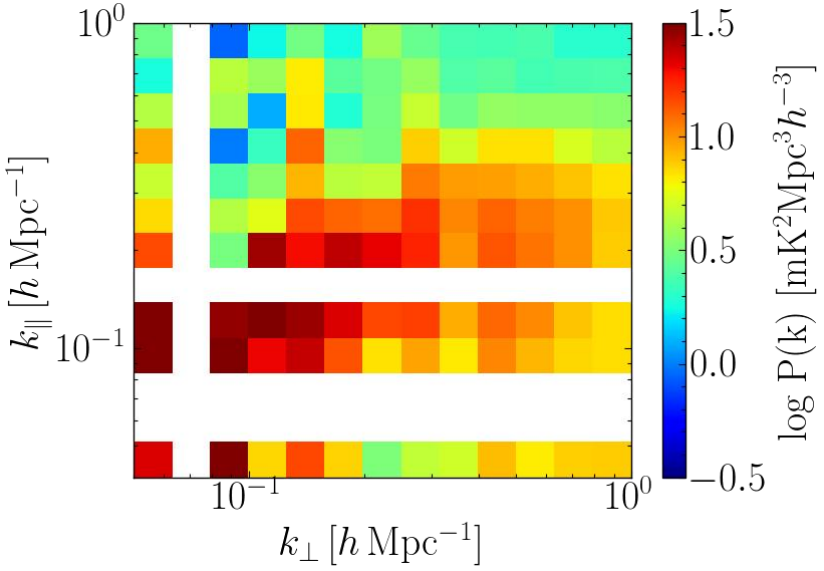
- 1D, 2D HI auto ps




$Tr_{HI}$ corrected 1D $P_{HI}$




2D $P_{HI}$ before correction




$Tr_{HI}$ corrected 2D $P_{HI}$