Coherent combination of BAO and coherent motions in Fourier space
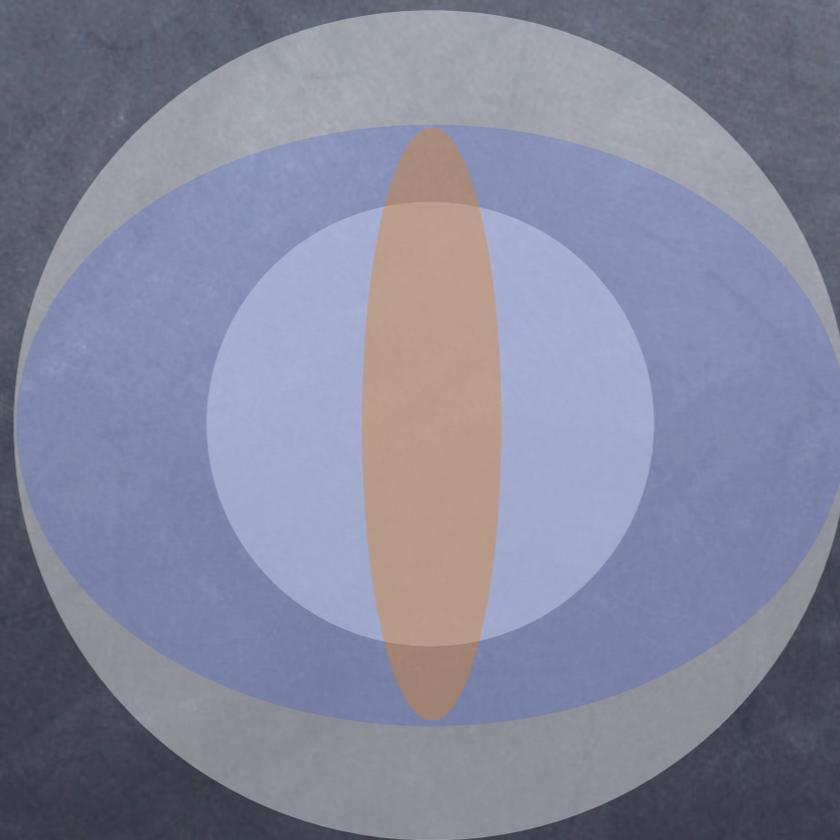
Correlation in redshift space

Galaxies (or Clusters) measure correlations amongst large scale local inhomogeneities, while the observed distortions in these correlations in redshift space can be used to extract information about peculiar velocities.

$$P_s(k,\mu) = P_{gg}(k) + 2\mu^2 P_{g\Theta}(k) + \mu^4 P_{\Theta\Theta}(k)$$
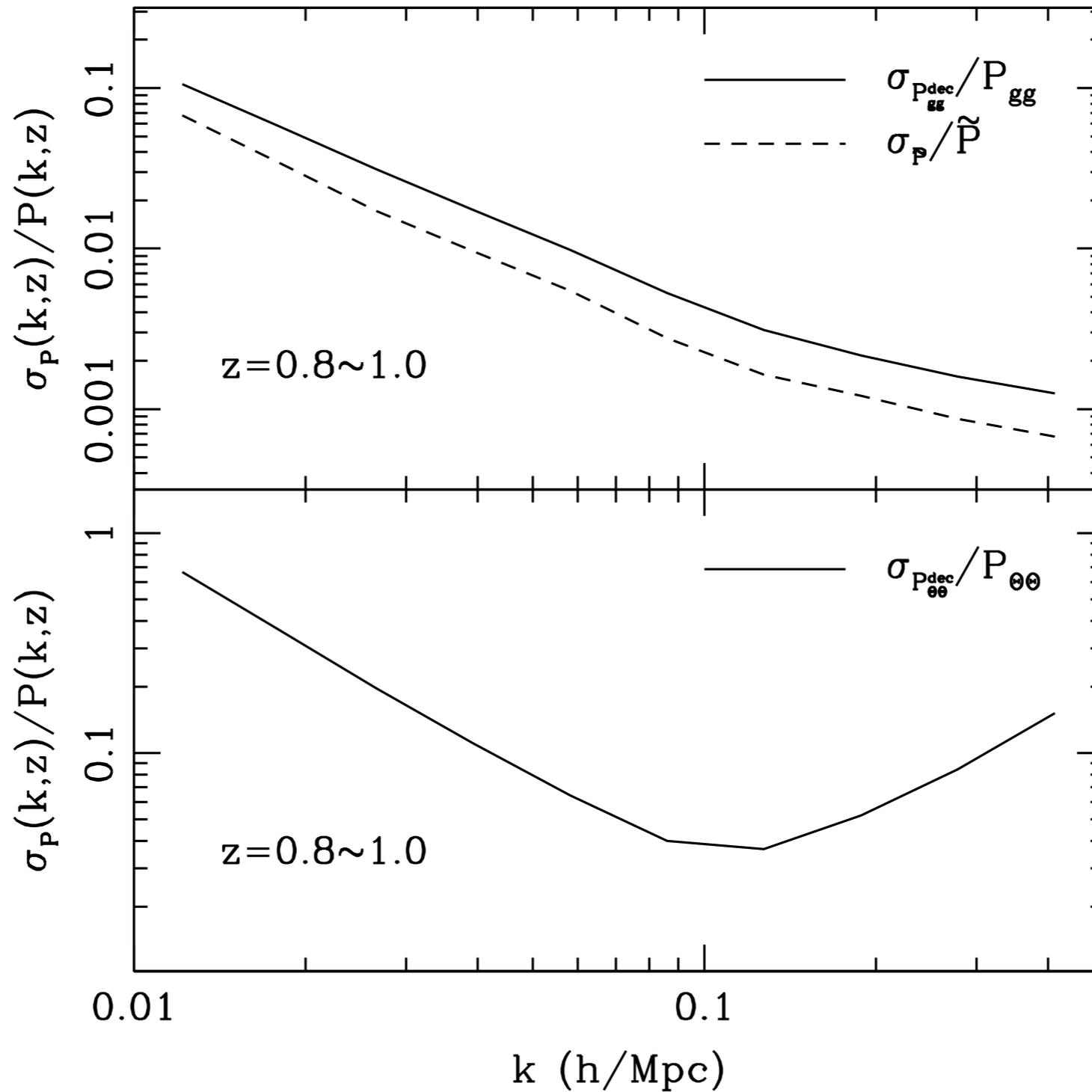
Squeezing effect
at large scales

(Kaiser 1987)

Finger of God
effect at small
sclaes

(Jackson 1972)

Simultaneous decomposition into P_{gg} and $P_{\Theta\Theta}$

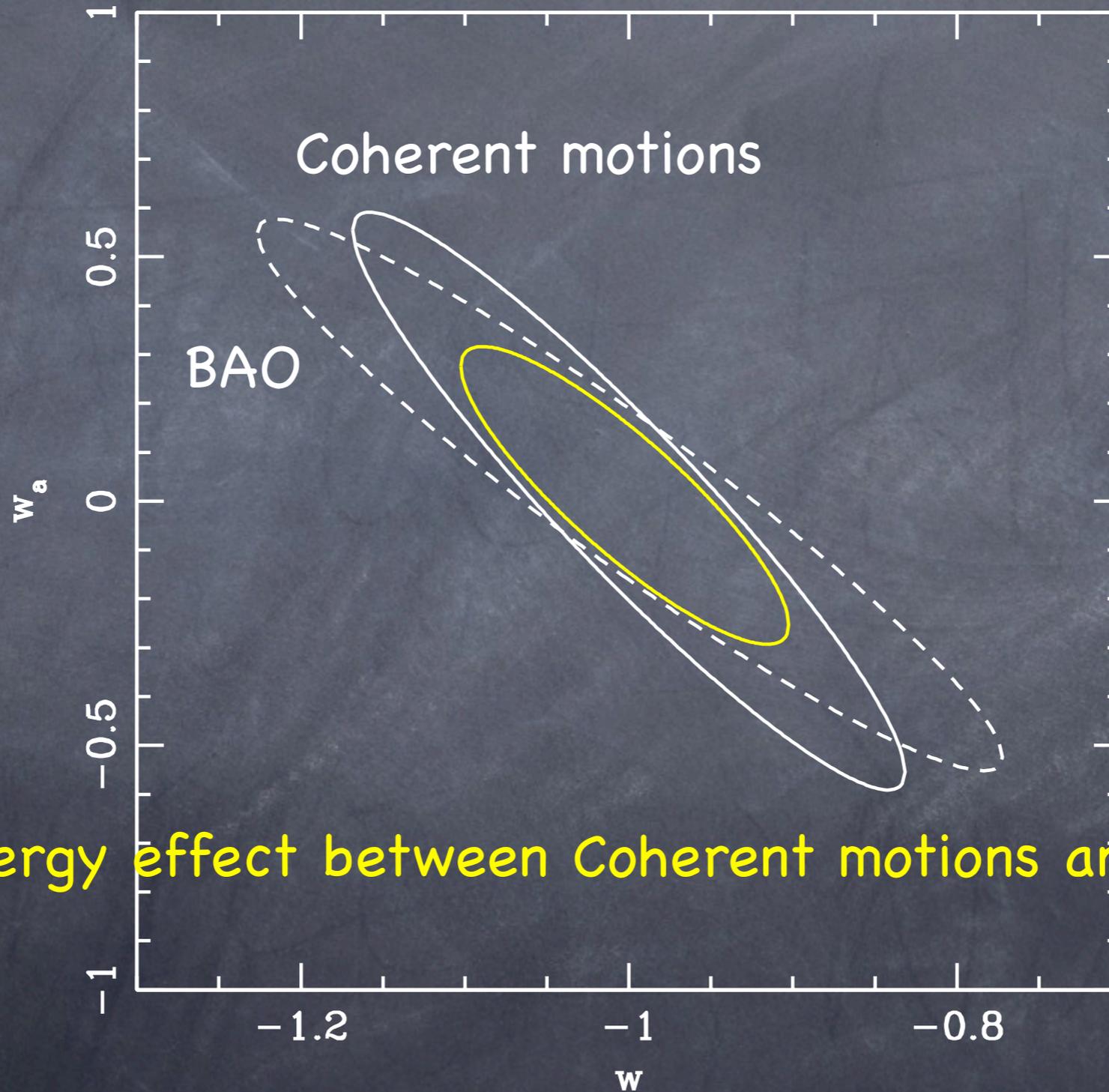# Coherent combination of BAO and $P_{\Theta\Theta}$

Cosmological constraints from $P_{\Theta\Theta}$ are estimated using Fisher matrix analysis,

$$F_{mn}^{\Theta\Theta} = \sum_{k=1}^{N_k^{\text{cut}}} \sum_{z_j=0}^{2} \frac{\partial P_{\Theta\Theta}(k_i, z_j)}{\partial x_m} \frac{1}{\sigma_{P_{\Theta\Theta}^{\text{dec}}}(k_i, z_j)^2} \frac{\partial P_{\Theta\Theta}(k_i, z_j)}{\partial x_n}.$$

BAO from decomposed P_{gg} is expressed as,

$$F_V^{P_{gg}^{\text{dec}}}(z_j) \sim 4\pi^2 A_0^2 \sum_{i=1}^{N_k} \frac{P_{0.2}^2}{\sigma_{P_{gg}^{\text{dec}}}(k_i, z_j)^2} G_{BAO}(k_i),$$

Dark energy constraint from $P_{\Theta\Theta}$

Coherent motions

BAO

w_a

w

Synergy effect between Coherent motions and BAO

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