Correcting for Non-Linear Distortions

of the Clustering Statistics with Local Transformations and Reconstruction

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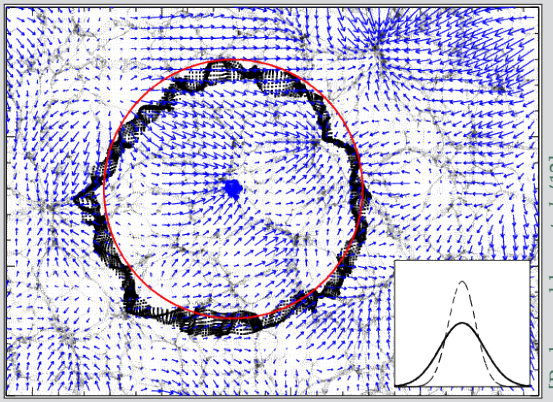
Standard Reconstruction for BAO measurements



[Padmanabhan *et al.* '12]

Large-scale bulk flow

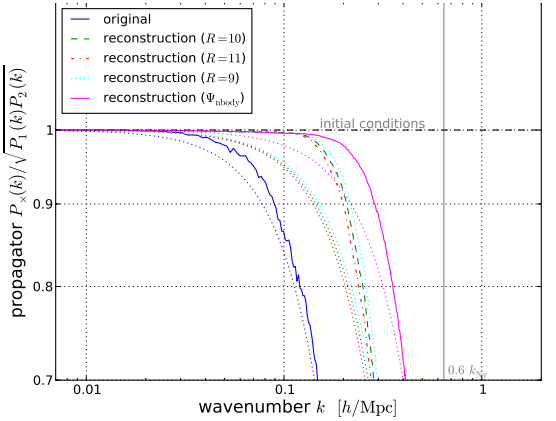
- **Reconstruction** (as introduced by [Eisenstein *et al.* '07]) was a great success for BAO detection

$$\Psi = \boldsymbol{\nabla}^{-1}\delta(z; R = 10\,\mathrm{Mpc}/h)$$

- Corrects for the large-scale bulk flow
- Enhances the BAO signal (4.2σ detection with SDSS [Padmanabhan *et al.* '12])
- **But**: small-scale distortions due to non-linear evolution still remaining

Improving Reconstruction using Better Displacement Field Estimators

- Can the propagator (cross power spectrum of δ_{rec} and δ_{IC}) be well described by a Gaussian?
- Standard reconstruction can be further improved by **better displacement field estimators**
- **Our question: can we find suitable local transformations?**



Propagator between $\delta(z=0)$, $\delta^R_{\mathrm{rec}}(z=0)$ *and* $\delta_{\mathrm{IC}}(z=63)$