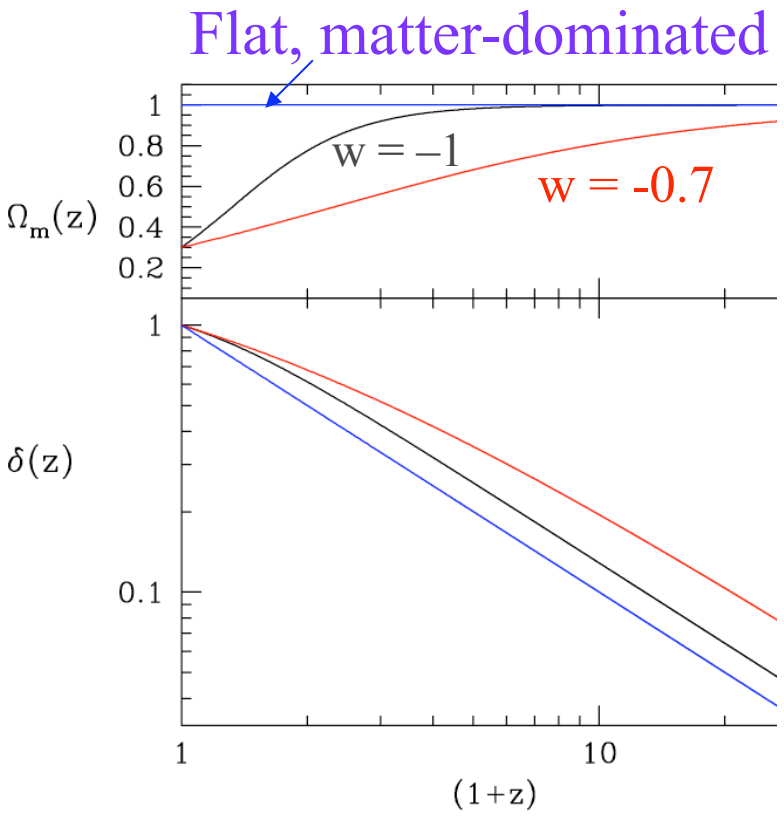
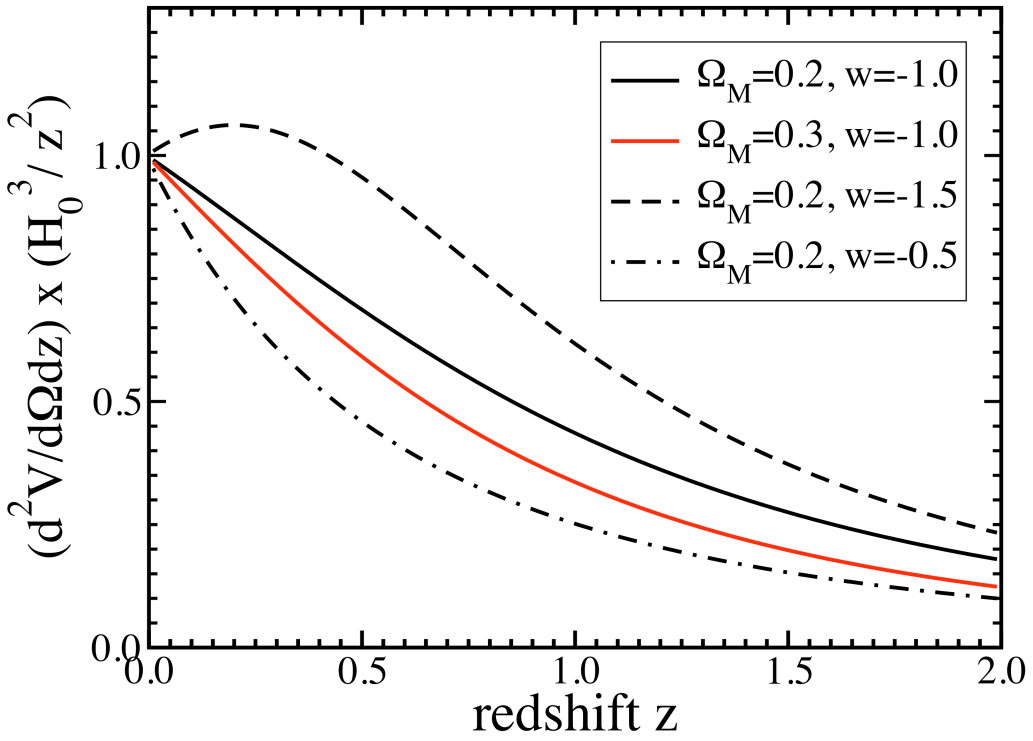
Growth of Density Perturbations



Volume Element



Raising *w* at fixed Ω_{DE}: decreases growth rate of density perturbations and decreases volume surveyed

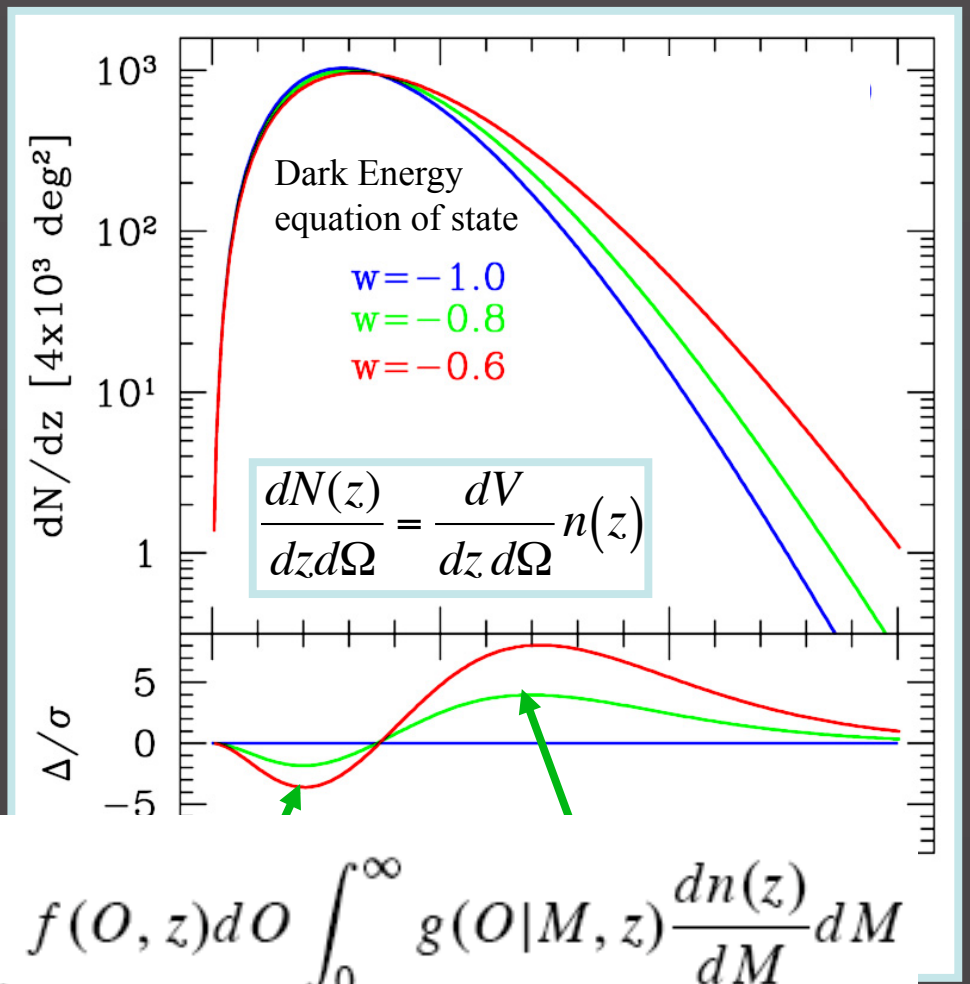
Clusters and Dark Energy

Number of clusters above observable mass threshold

- Requirements
  1. Understand formation of dark matter halos
  2. Cleanly select massive dark matter halos (galaxy clusters) over a range of redshifts
  3. Redshift estimates for each cluster
  4. Observable proxy that can be used as cluster mass estimate:

     p(O|M,z)

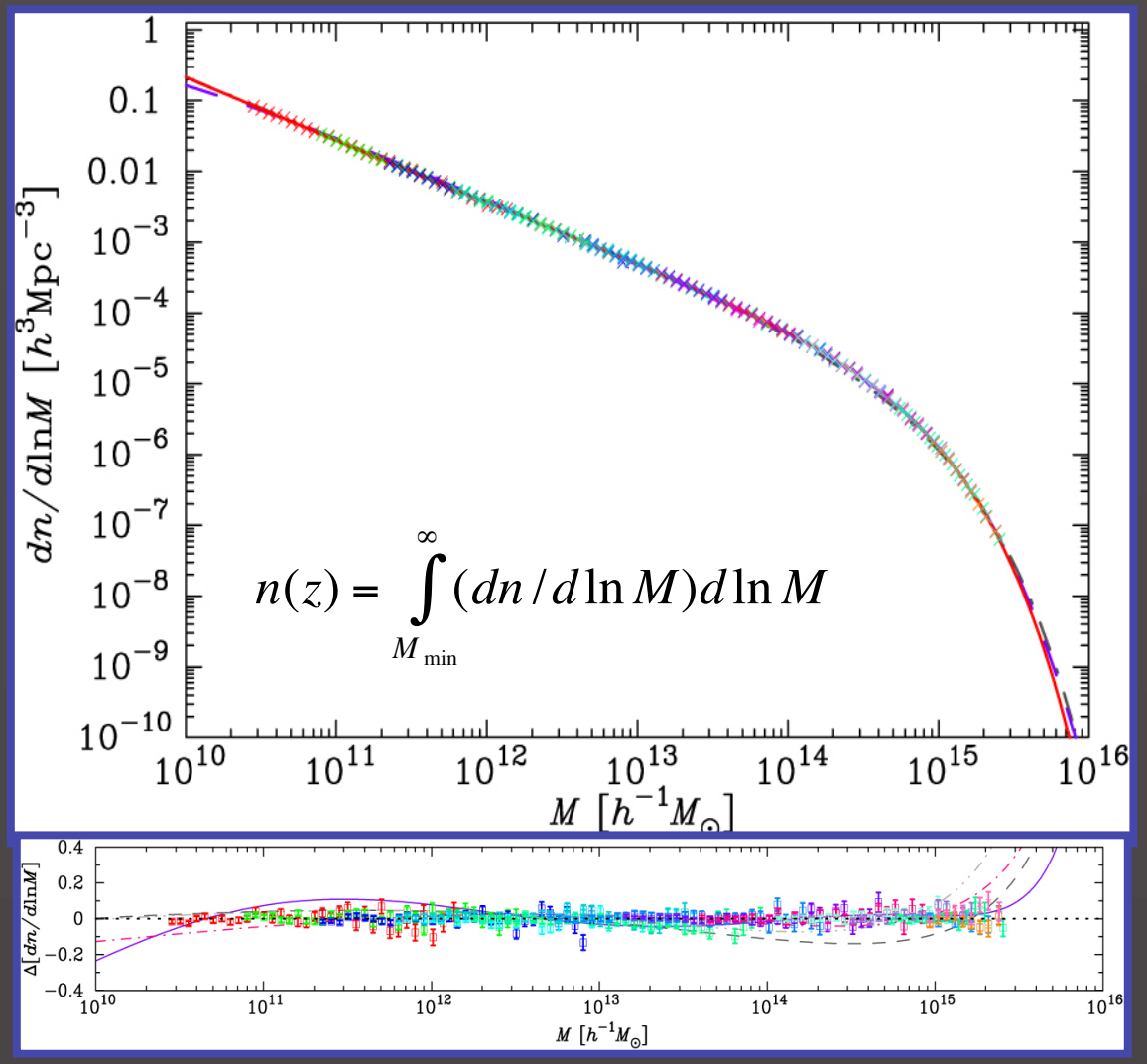
Primary systematic:



$$\frac{d^2N(z)}{dz d\Omega} = \frac{c}{H(z)} D_A^2 (1+z)^2 \int_{O_{min}}^{\infty} f(O,z) dO \int_0^{\infty} g(O|M,z) \frac{dn(z)}{dM} dM$$

(geometry)

Theoretical Abundance of Dark Matter Halos



Warren etal