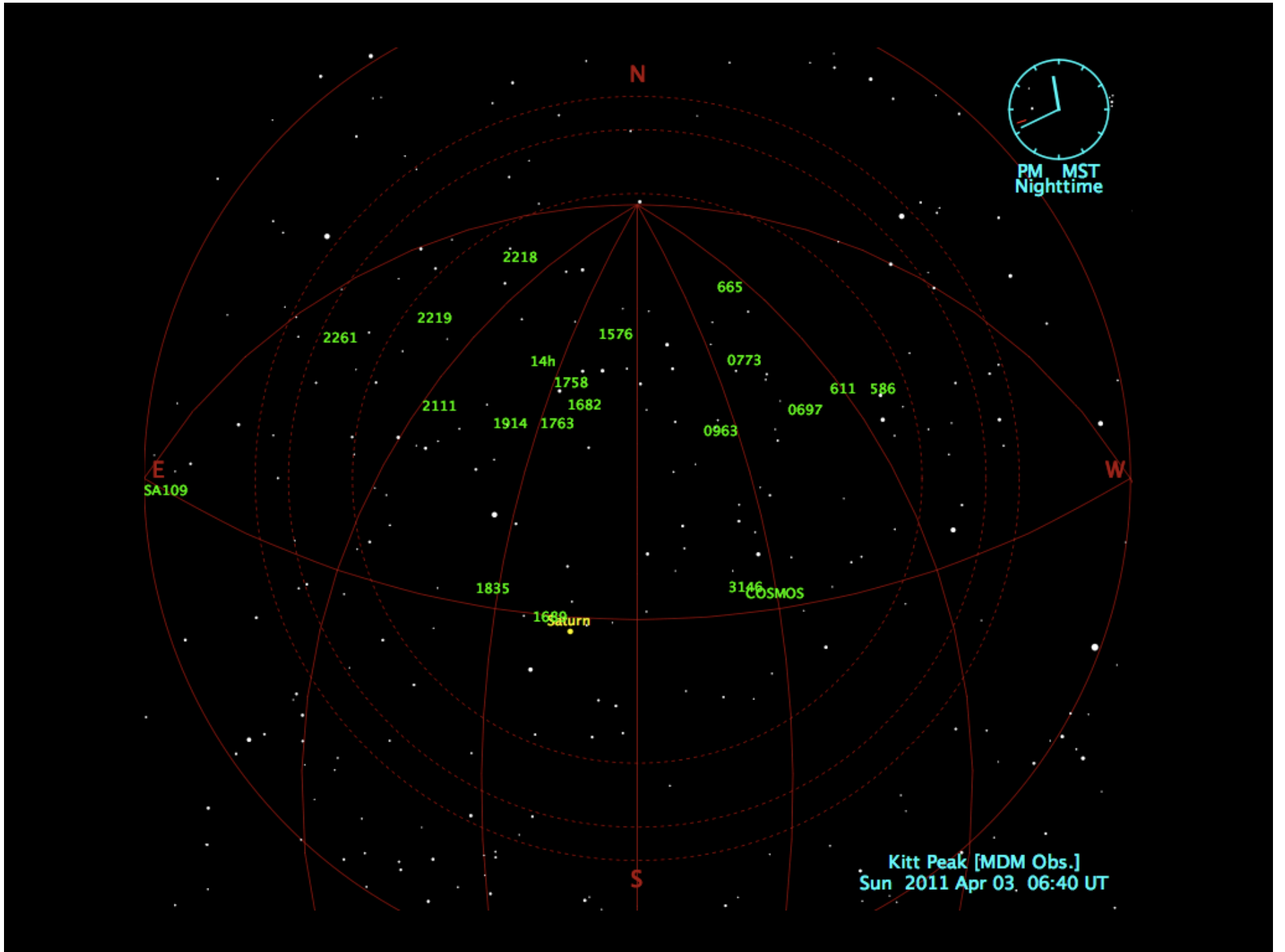
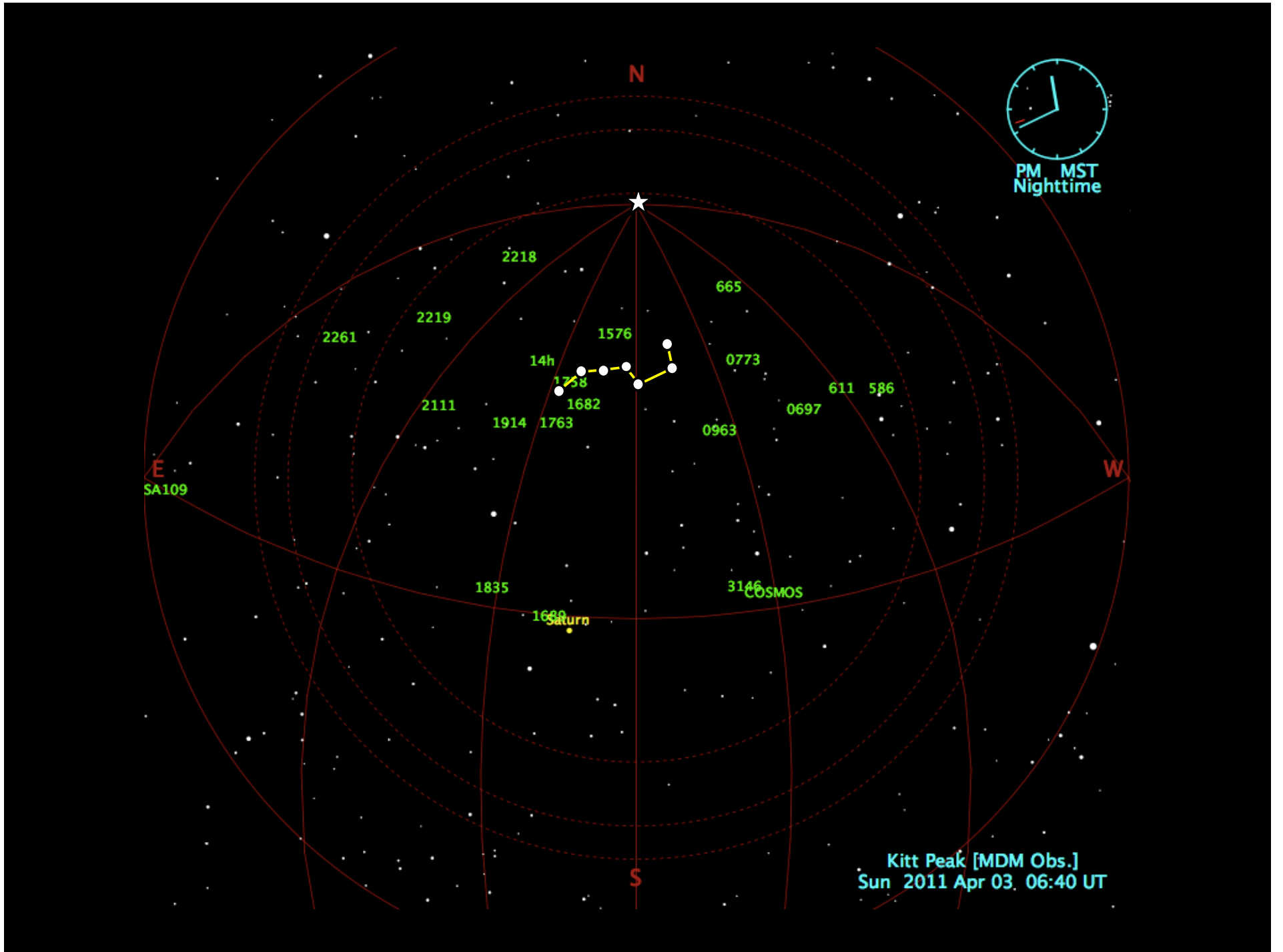


# Precision galaxy cluster mass estimates with weak gravitational lensing

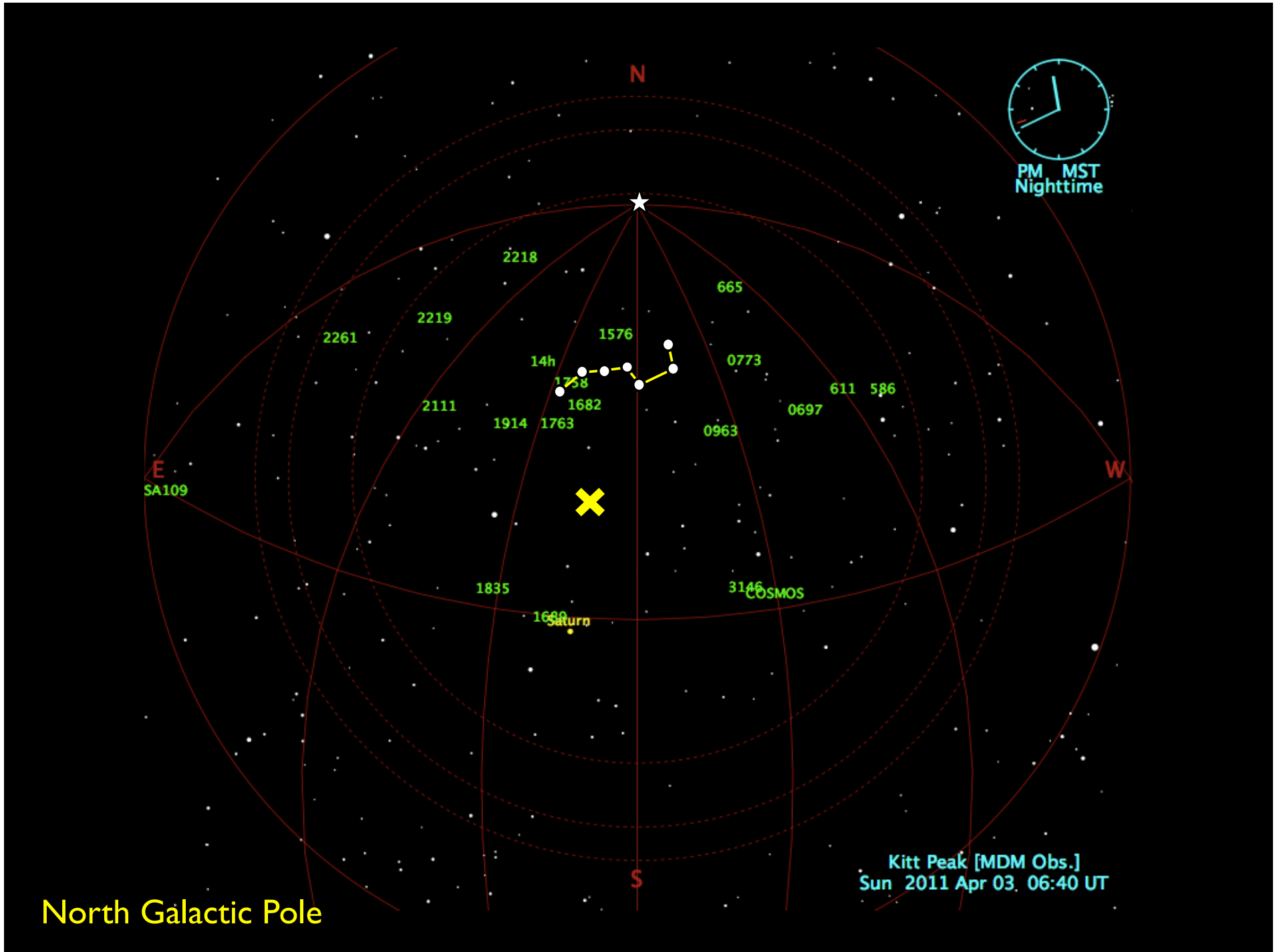
Cosmology in Northern California  
October 22, 2010  
Reiko Nakajima



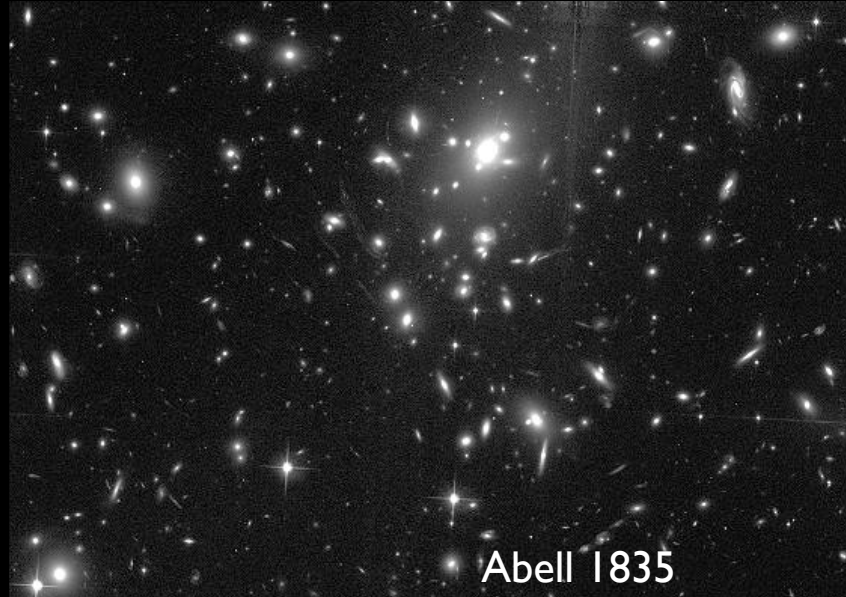
Kitt Peak [MDM Obs.]  
Sun 2011 Apr 03, 06:40 UT



Kitt Peak [MDM Obs.]  
Sun 2011 Apr 03, 06:40 UT



# Supermassive Cluster Survey



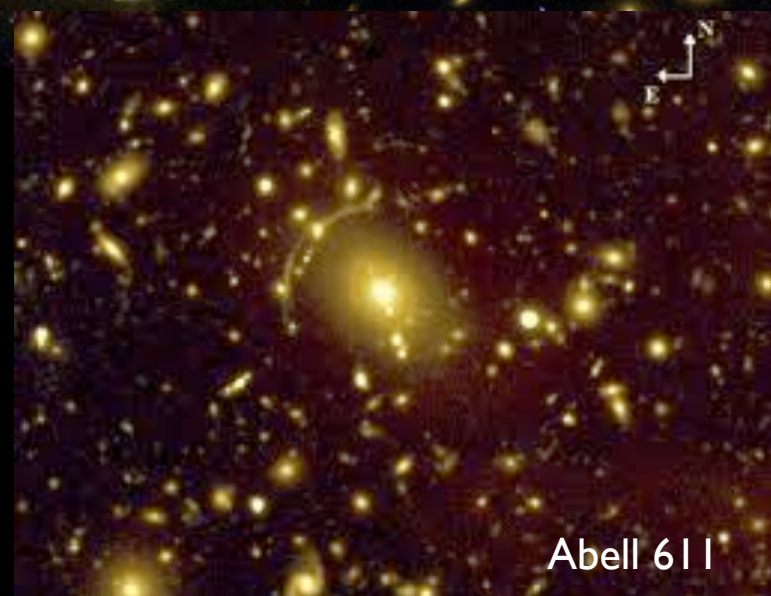
Abell 1835



Abell 2218

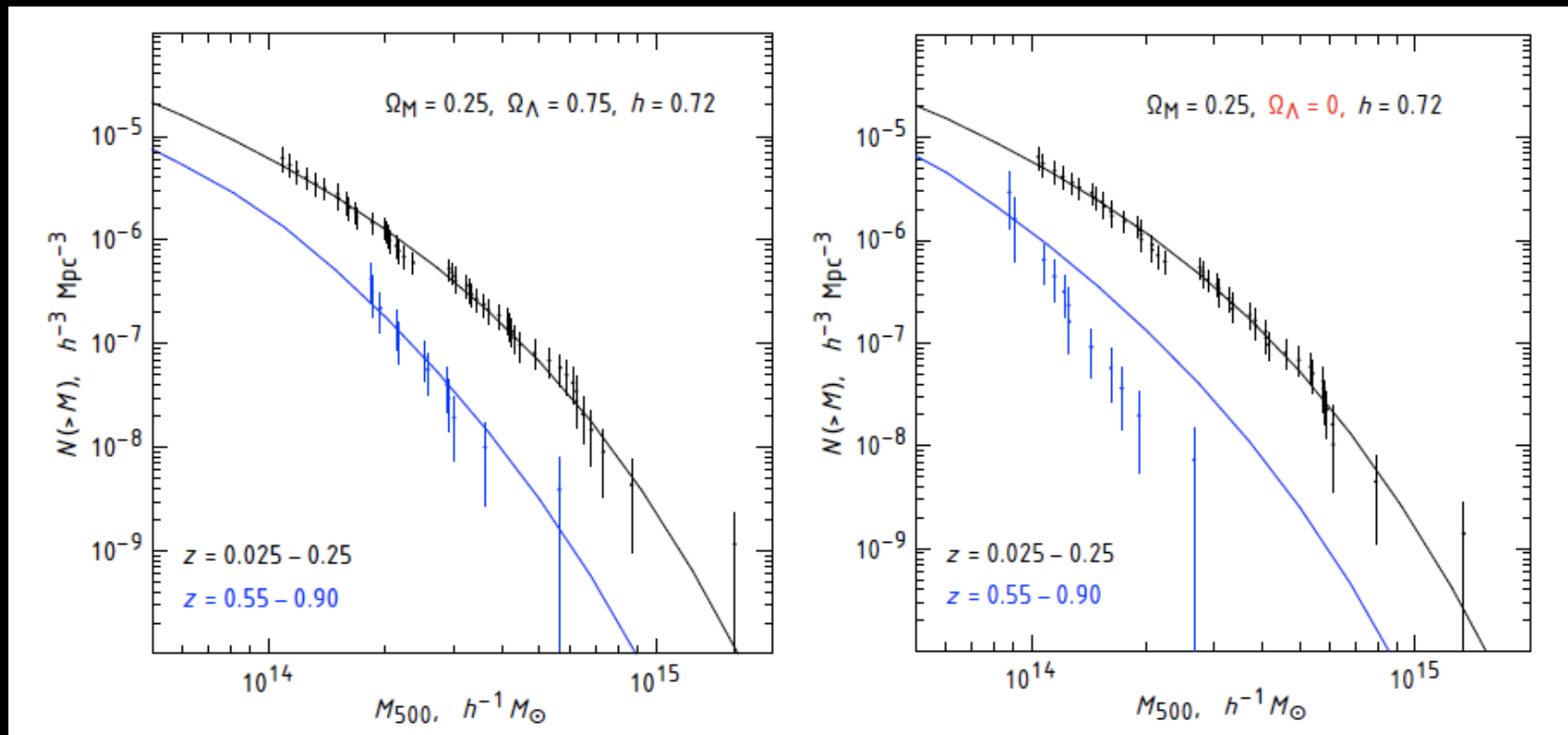


Abell 1689



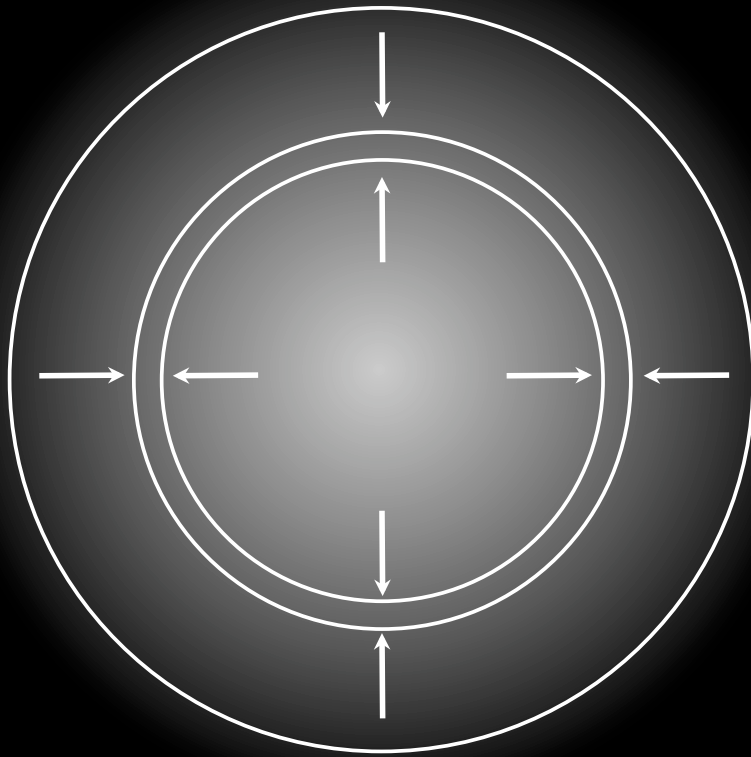
Abell 611

# Cluster mass function theory vs. observation



Vikhlinin et al. (2008)

# Measuring mass with X-ray

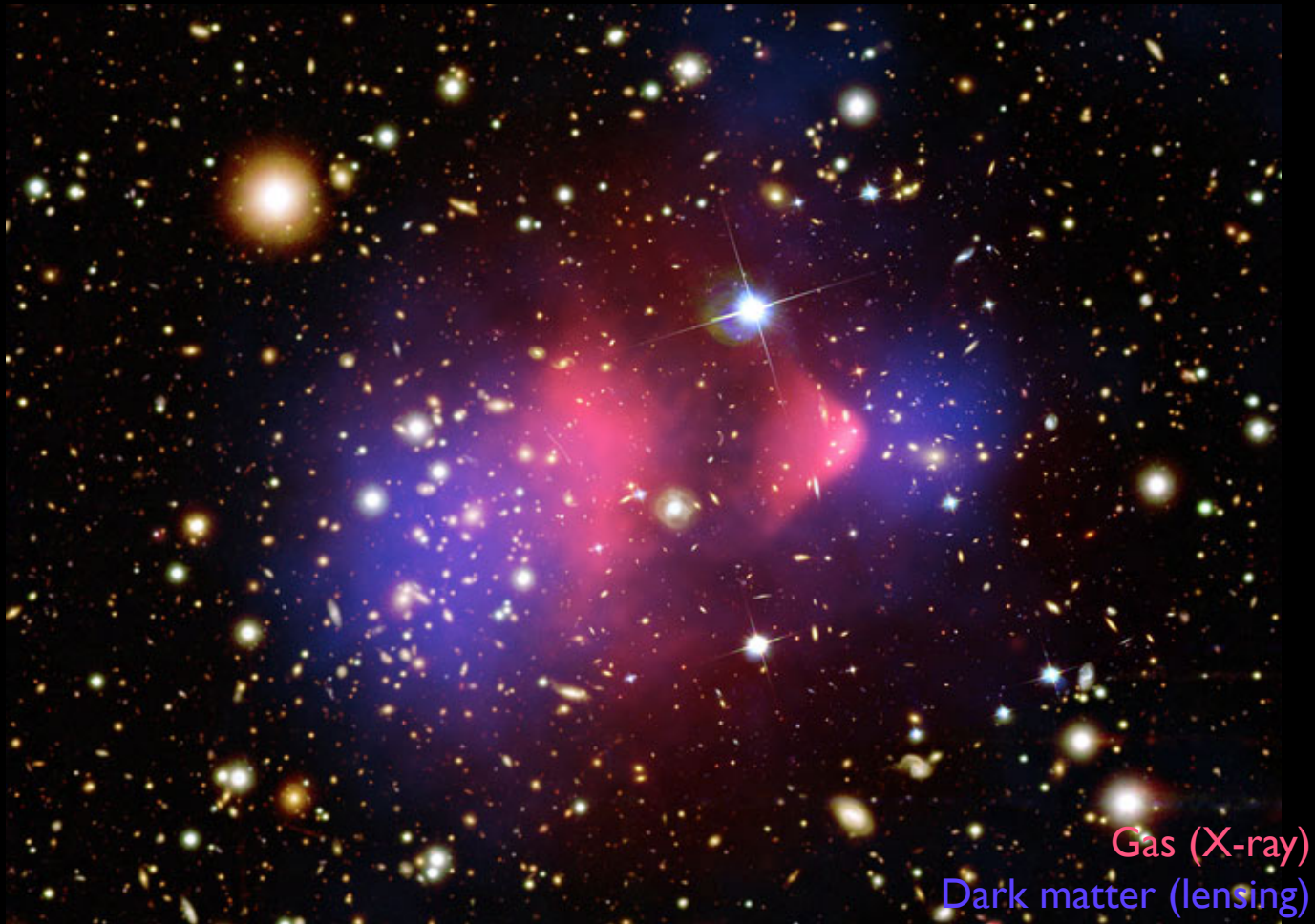


spherical

radial profile

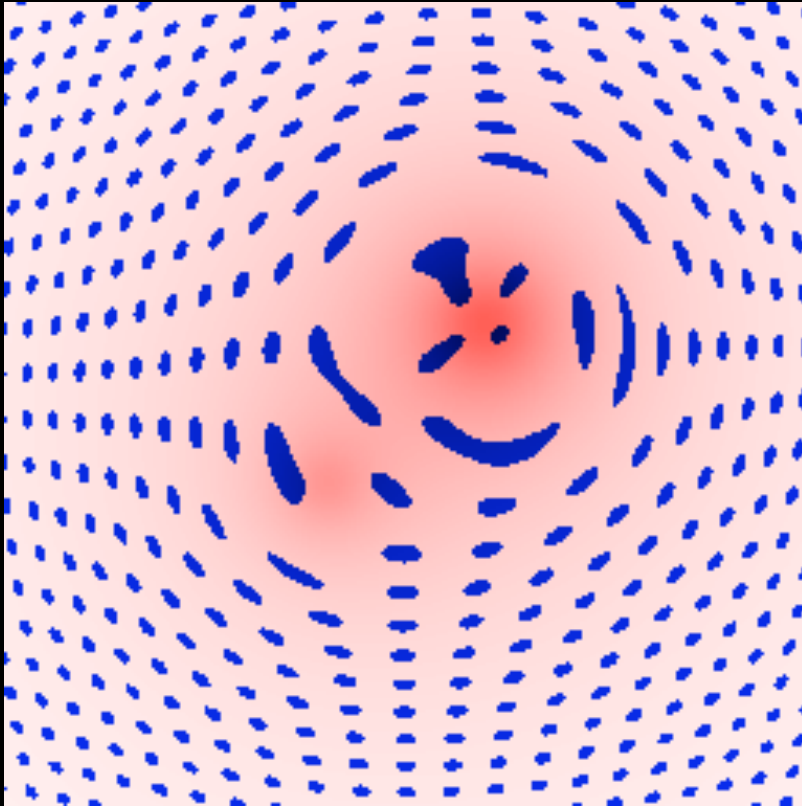
hydrostatic equilibrium

# Measuring mass with X-ray hydrostatic equilibrium out the window



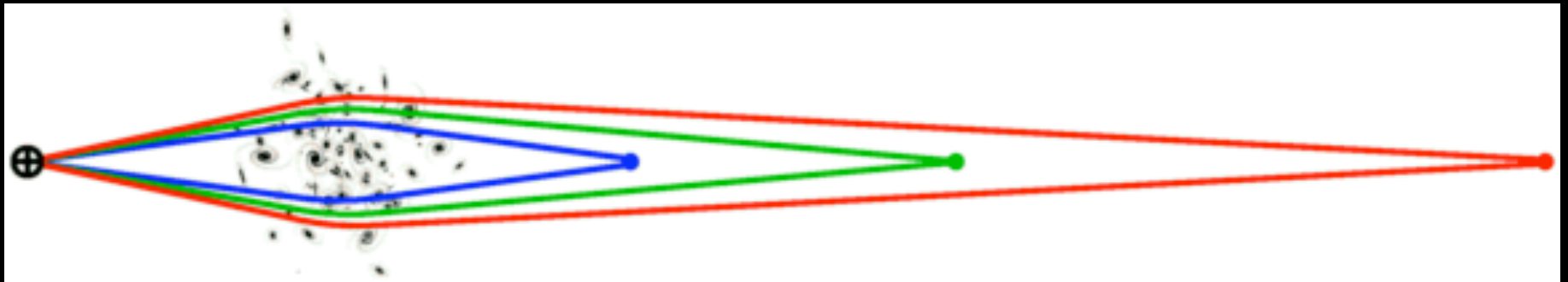


# Measuring mass with gravitational lensing



distortion due to  
gravitational potential  
only

# Measuring mass with gravitational lensing mass calibration depends on distance



# Photometric redshifts

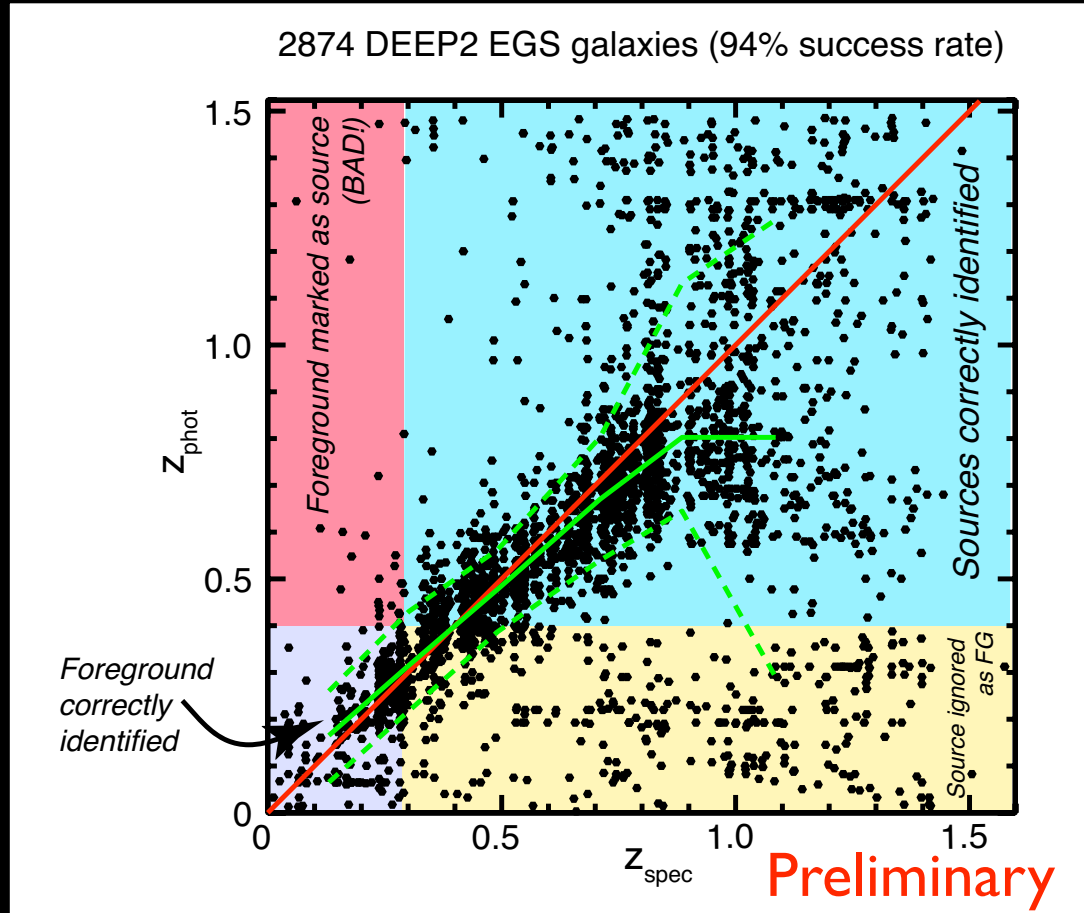
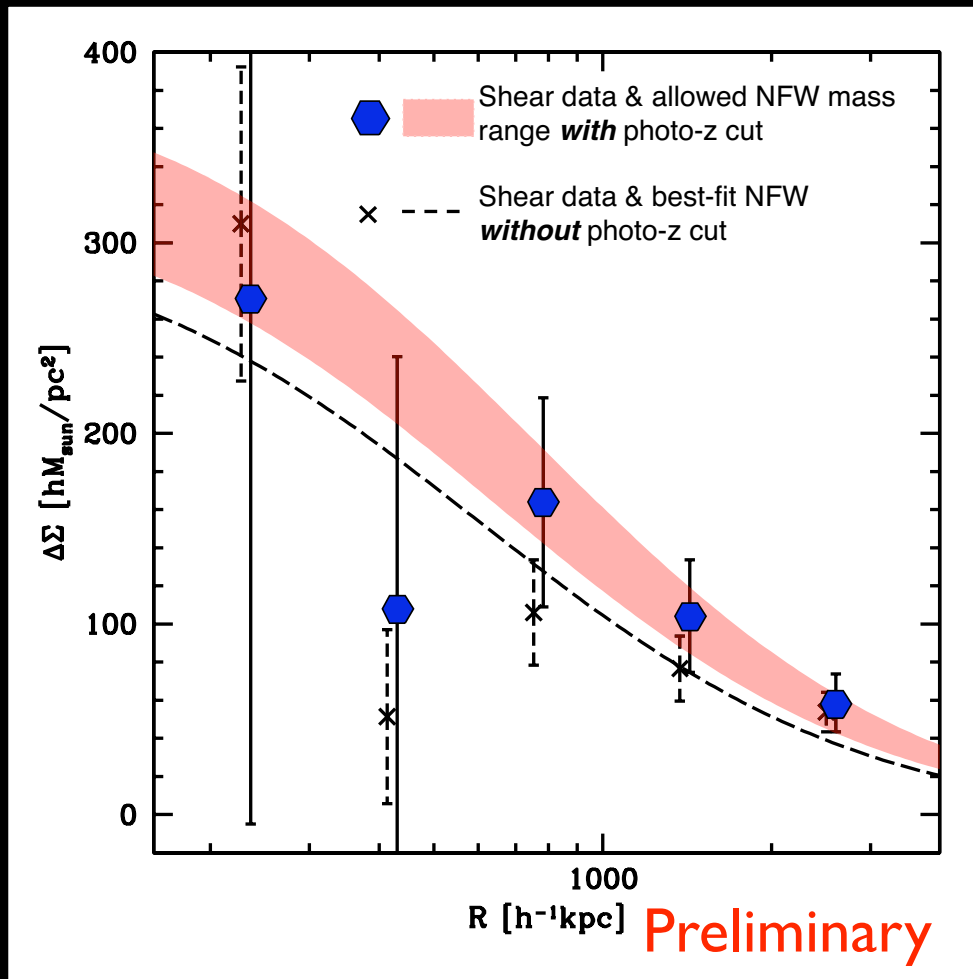


photo-z error  
high

mass calibration  
error  $< 1\%$

# Photometric redshifts removes contamination



cluster member  
contamination  
< 3%

# Mass estimate: Intrinsic scatter vs. measurement uncertainty

