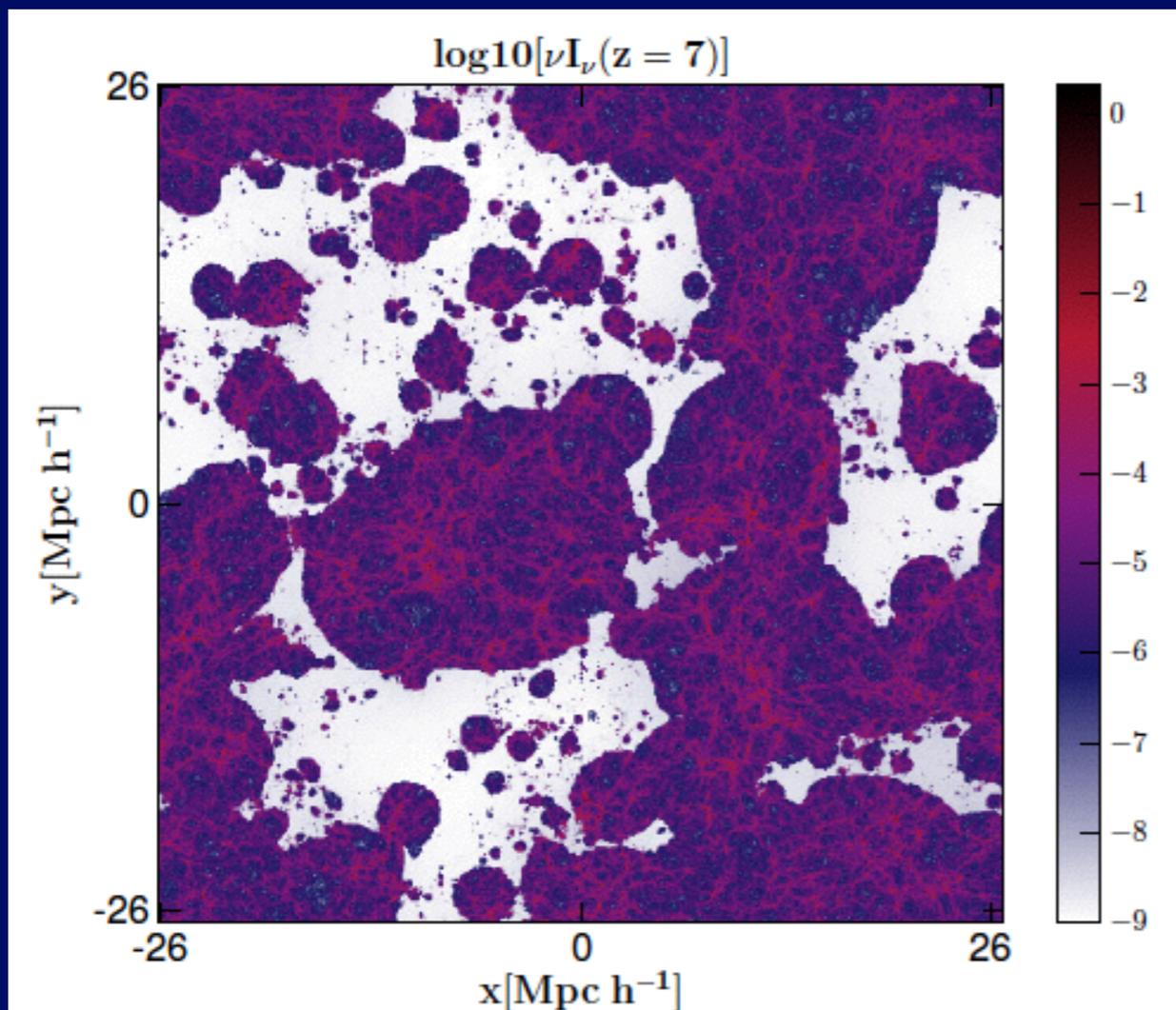# Cosmic Dawn Intensity Mapper

Scientific goal: produce three-dimensional maps of reionization from z=6-12 with Lyman-alpha as a tracer.

Applications: reionization tomography, cross-correlate with 21-cm

$\log 10[\nu I_\nu(z = 7)]$

Total Ly-α intensity from galaxies and the IGM in erg s^{-1} cm^{-2} sr^{-1} at redshift 7

- Galaxy contributions:
  - Recombinations
  - Excitations/decays
  - gas cooling (gravitational collapse)
  - Ly-α emission from stars

  α SFR

- IGM contributions:
  - Recombinations
  - Excitations/decays
  - Scattering of Ly-n photons from galaxies
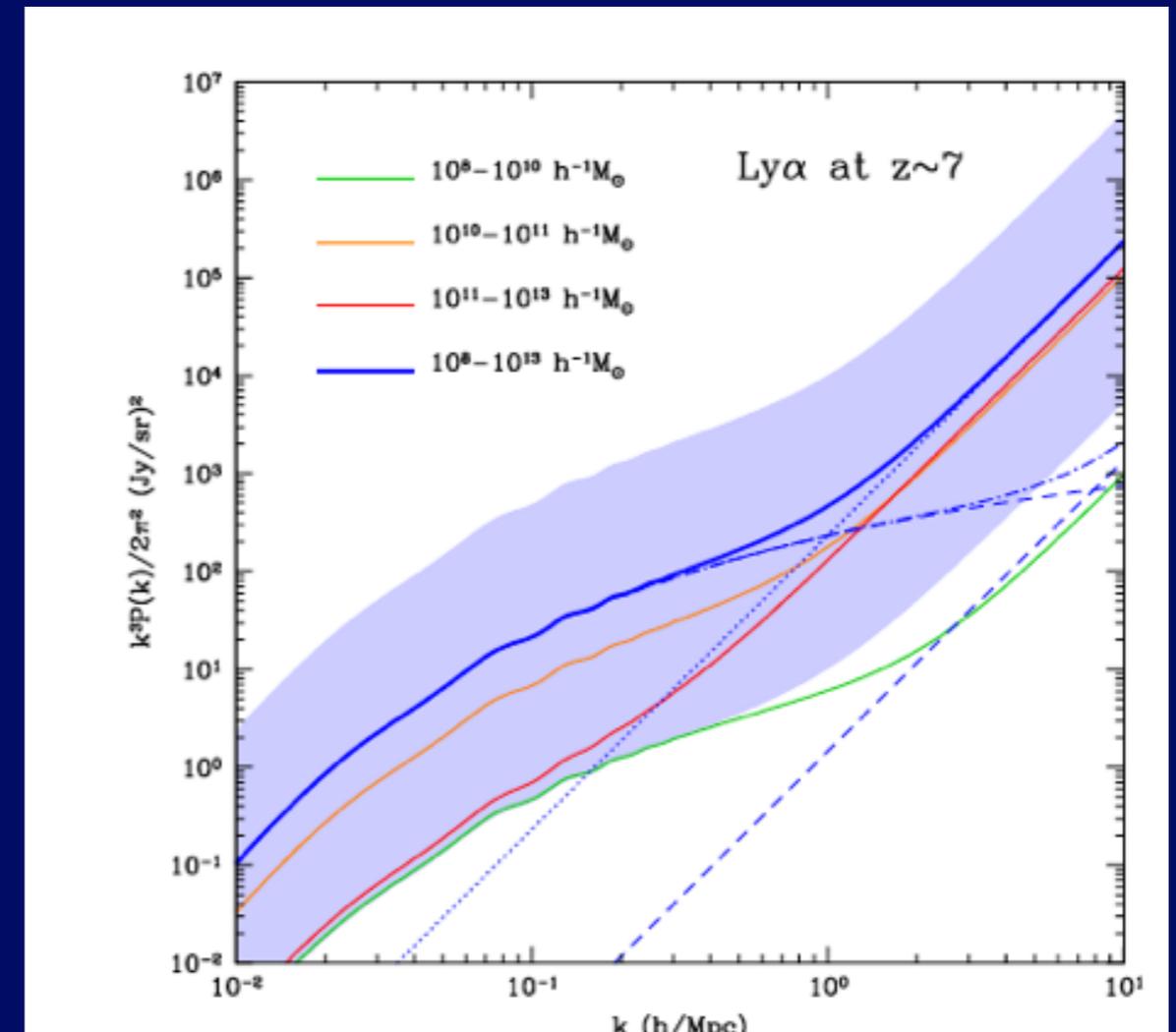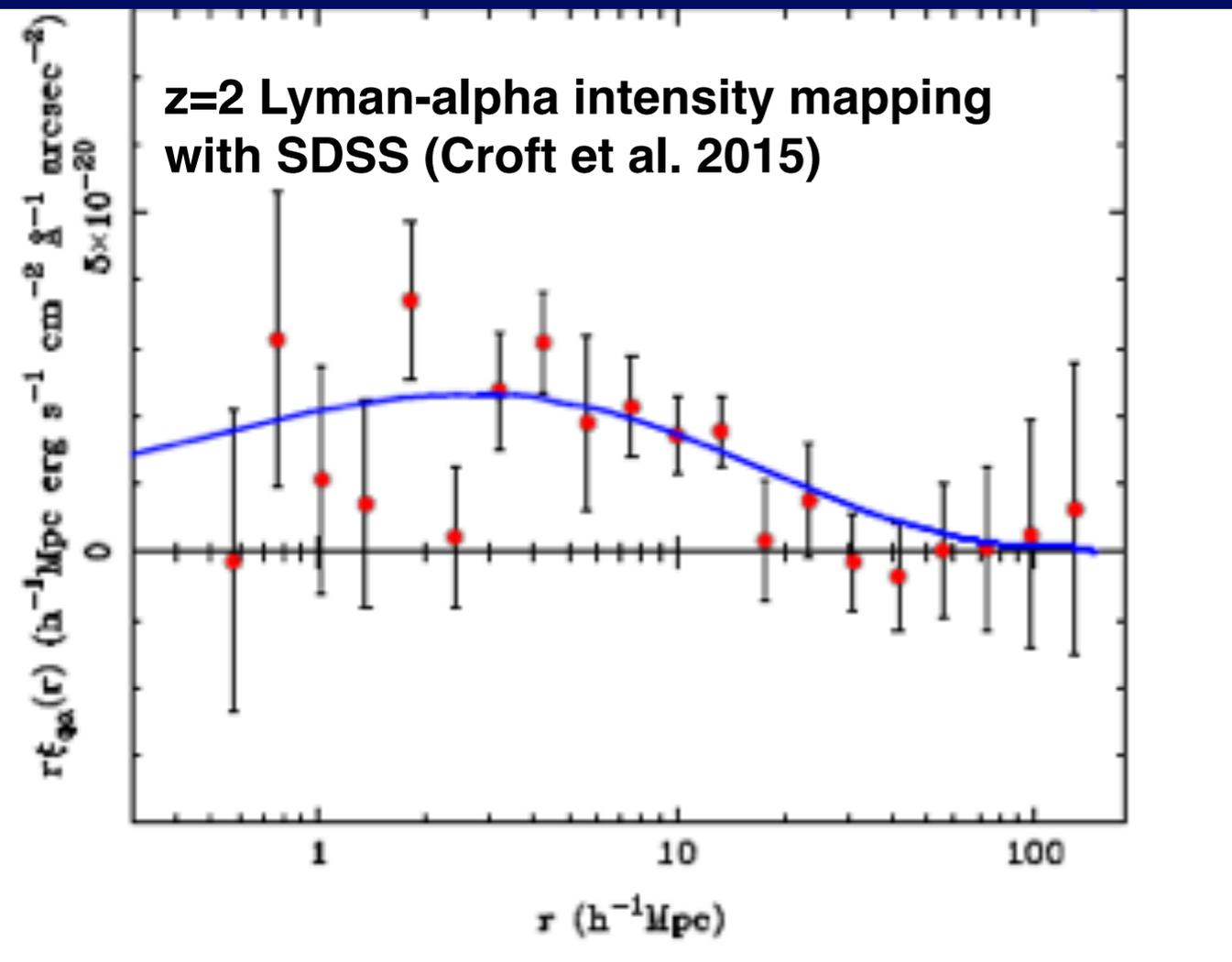
  T_K, x_i

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Cosmic Dawn Intensity Mapper

Scientific goal: produce three-dimensional maps of reionization from z=6-12 with Lyman-alpha as a tracer.

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z=2 Lyman-alpha intensity mapping with SDSS (Croft et al. 2015)

Lyman-alpha intensity mapping reionization applications discussed in Gong et al. 2013; Pullen et al. 2013

Numerical simulation predictions: Silva et al. 2014

- Large uncertainty in the relation (SFR, UV escape fraction, Lya escape fraction)

- Dominated by 10^{10} - 10^{11} M_{sun} halos!!

Cosmic Dawn Intensity Mapper

Survey requirements: R=500-1000 spectral imaging around 0.9-1.6 micron, 200-300 deg2 survey down to 1e-18 erg/cm2/s line flux density, 26th mag point detections (in broad bands)

Instrumental requirements: ~1.5m aperture.
Spectral imaging/integral field options are to be studied.
A possibility is linear variable filters, LVFs.

Can be extended to include Halpha etc (gets more expensive)
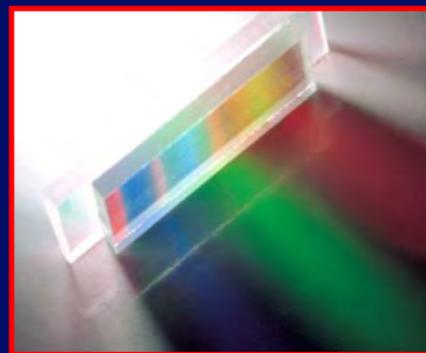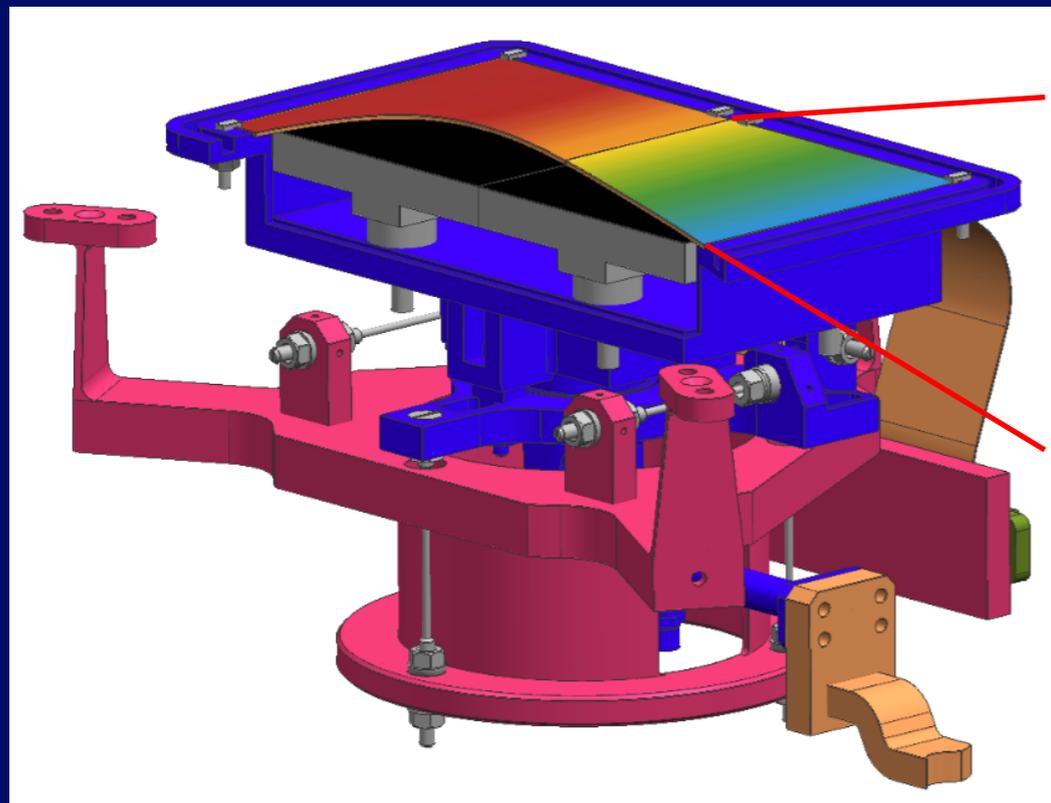
Linear Variable Filter

See SPHEREx posters tomorrow (session 147)

Asantha Cooray

if interested in contributing to CDIM
please contact acooray@uci.edu