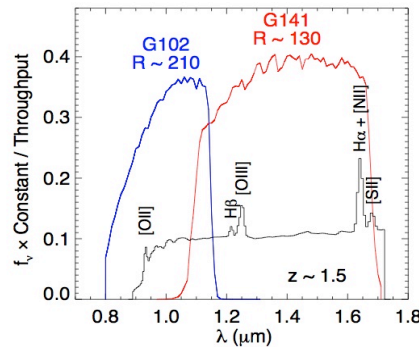
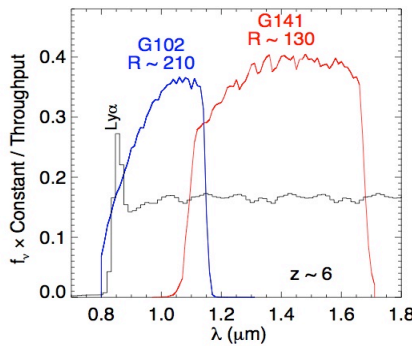


The Power of WFC3/IR Grism Spectroscopy: An Emission Line Survey of the $z \sim 1-8$ Universe

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1. The Concept:

WFC3/IR grism spectroscopy is sensitive to Ly α at $z > 5.5$, and potentially to $z \sim 8$. Using both G102 + G141 enables discrimination between intermediate- z interlopers based on the presence of additional longer wavelength emission lines. These interlopers are important in their own right, as an unbiased emission-line selected sample with large spectral coverage.

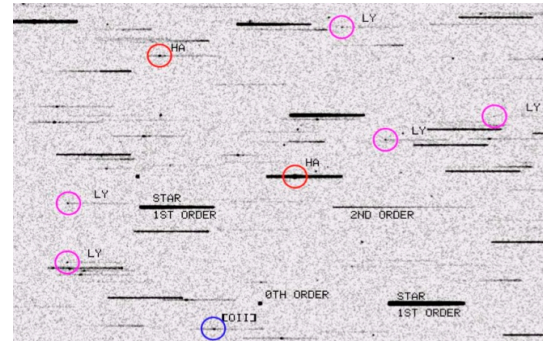
2. The Survey:

A pure-parallel (serendipitous) survey is planned (GO 11696, PI M. Malkan). This includes:

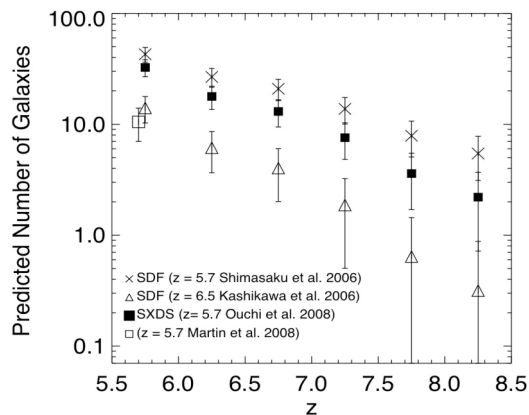
- 40 parallel fields = ~ 190 arcmin²
- typically 5 orbits each, using G102, G141, F110W and F160W
- Total: 250 orbits awarded

Advantages

- Large Δz means large volume ($> 10^6$ Mpc³ for the entire Ly α survey).
- Typical Ly α flux limit (\sim few $\times 10^{-17}$ erg s⁻¹ cm⁻²) is significantly deeper than conventional IR narrow band imaging



A simulated G102 observation (45 x 60")



Predicted number of LAEs that we expect to find, based on different luminosity function measurements (assuming no redshift evolution).

3. Predicted Results:

- Tens of LAEs at $z \sim 5.5 - 6.5$ should enable a test of the claims of evolution from narrow band luminosity functions (Shimasaku et al. 2006; Kashikawa et al. 2006; Ouchi et al. 2008).
- Other line emitters enable measurement of the H α luminosity function, dust extinction, and metallicity at $z \sim 1-2$. We predict large numbers of these "interlopers:"
 - ~ 1300 H α
 - ~ 400 H α , [OIII]
 - ~ 200 H α , [OIII], [OII]
 - $\sim 100-150$ H α , H β
 - ~ 40 H α , H β , [OIII], [OII]

References:

- Martin, C., et al. 2008, ApJ, 679, 942
 Ouchi, M., et al. 2008, ApJS, 176, 301
 Kashikawa, N. et al. 2006, ApJ, 648, 7
 Shimasaku, K. et al. 2006, PASJ, 58, 313