

COS-GTO: Great Wall Tomography

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Scientific Category: QUASAR ABSORPTION LINES AND IGM

Scientific Keywords: GALACTIC STRUCTURE, GALAXY FORMATION AND EVOLUTION,
GALAXY HALOS, LARGE SCALE STRUCTURE AND PECULIAR
VELOCITIES, LYMAN-ALPHA FOREST CLOUDS

Abstract

This is a program to observe several targets behind the Great Wall (GW), a typical galaxy filament in the Universe. The approach is to observe a series of targets in one area of sky to perform a "cosmic tomography" in a 10 Mpc^2 region which includes sightlines through regions of varying galaxy density from no galaxies within 3 Mpc of the sight line to a dozen or more galaxies within 3 Mpc of the sight line. The Sloan Digital Sky Survey (SDSS) plus various CfA redshift surveys are nearly complete at Great Wall distances to $0.1-0.25L^*$, making the available galaxy survey material sufficient for this study. This program will address several science drivers, including probing the typical covering factor of warm, photoionized gas in galaxy filaments and the metallicity of such gas and how far it is spread from large and small galaxies. Preliminary studies suggest such material extends $\sim 800 \text{ kpc}$ from the nearest L^* galaxy (even if that galaxy is not the source of the gas) and $\sim 250 \text{ kpc}$ from the nearest $0.1L^*$ galaxy. (H_0 assumed to be 70 km/s/Mpc)

Investigators:

| | Investigator | Institution | Country |
|-------|---------------------|-----------------------------------|---------|
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Number of investigators: 2

Admin CoI: Dr. Cynthia Froning

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Target Summary:

| Target | RA | Dec | Magnitude |
|------------|---------------|--------------|--------------------------------------|
| TON580 | 11 31 9.5000 | +31 14 5.00 | V = 16.0 +/- 0.2, F(1250) = 1.00E-14 |
| PG1115+407 | 11 18 30.3000 | +40 25 54.00 | V = 15.9 +/- 0.2, F(1250) = 1.10E-14 |
| PG1121+422 | 11 24 39.2000 | +42 01 45.00 | V = 16.0 +/- 0.2, F(1250) = 1.10E-14 |
| PG1048+342 | 10 51 43.9000 | +33 59 27.00 | V = 16.8 +/- 0.2, F(1250) = 0.60E-14 |

Observing Summary:

| Target | Config Mode and Spectral Elements | Flags | Orbits |
|------------|-----------------------------------|-------|--------|
| TON580 | COS/FUV Spectroscopic G130M | | 4 |
| | COS/FUV Spectroscopic G160M | | |
| PG1115+407 | COS/FUV Spectroscopic G130M | | 4 |
| | COS/FUV Spectroscopic G160M | | |
| PG1121+422 | COS/FUV Spectroscopic G130M | | 4 |
| | COS/FUV Spectroscopic G160M | | |
| PG1048+342 | COS/FUV Spectroscopic G130M | | 3 |
| PG1048+342 | COS/FUV Spectroscopic G160M | | 4 |

Total prime orbits: 19

This is a COS GTO project, no scientific justification is needed.