Hubble Space Telescope

Cycle 17 GTO/COS Proposal

COS-GTO: COOL, WARM AND HOT GAS IN THE COSMIC WEB AND IN GALAXY HALOS

Principal Investigator: Dr. James C. Green

Institution: University of Colorado at Boulder

Electronic Mail: jgreen@origins.colorado.edu

Scientific Category: QUASAR ABSORPTION LINES AND IGM

Scientific Keywords: GALAXY HALOS, LYMAN-ALPHA FOREST CLOUDS, METAL ABSORPTION SYSTEMS

Abstract

COS G130M and G160M 20,000 resolution observations will be obtained for 17 QSOs to study cool, warm and hot gas in the cosmic web and in galaxy halos. 5 QSOs with z from 0.177 to 0.574 and sum z = 1.68 will be observed with S/N = 40-50 per resolution element. 12 QSOs with z = 0.286 to 0.669 and sum z = 5.57 will be observed with S/N = 30-40. The observations will allow a wide range of IGM studies including determining the frequency of occurrence of the different types of absorption systems detected, along with studies of the physical conditions and elemental abundances in the different systems. Special emphasis will be given to a study of the properties of highly ionized IGM as traced by O VI, O V, O IV, N V, and C IV. The high S/N of the observations will allow a search for broad Lyman alpha absorption and weak metal line absorption that can be crucial for the evaluation of physical conditions and elemental abundances. Supporting ground based observations will allow studies of the association of the absorbers with galaxy structures along the 17 lines of sight. The overall goal of the program will be to obtain the information that will allow an assessment of the baryonic content of the IGM as revealed by UV and EUV absorption lines seen in the spectra of QSOs.

Investigators:

	Investigator	Institution	Country
PI	Dr. James C. Green	University of Colorado at Boulder	USA/CO
CoI#&	Dr. Cynthia Froning	University of Colorado at Boulder	USA/CO

Number of investigators: 2

Admin CoI: Dr. Cynthia Froning

& Contact CoI: Dr. Cynthia Froning

Target Summary:

Target	RA	Dec	Magnitude
PKS0405-123	04 07 48.3600	-12 11 36.96	V = 14.82 +/- 0.2, F(1200)=2.0E-14
HE0226-4110	02 28 15.2000	-40 57 16.00	V = 15.2 +/- 0.2, F(1700) = 2.80E-14
PG1116+215	11 19 8.6000	+21 19 18.00	V = 15.17 +/- 0.2, F(1800) = 4.00E-14
PG0953+414	09 56 52.4100	+41 15 22.10	V = 14.5 +/- 0.2, F(1200) = 4.00E-14
PHL1811	21 55 1.5000	-09 22 25.00	V = 14.1 +/- 0.2, F(1700) = 5.00E-14
HE0238-1904	02 40 32.5000	-18 51 51.00	V = 15.0 +/- 1.0, F(1800) = 1.80E-14
PKS1302-102	13 05 33.0000	-10 33 19.00	V = 14.9 +/- 0.2, F(1200) = 2.00E-14
PG1001+291	10 04 2.5000	+28 55 35.00	V = 15.5 +/- 0.2, F(1700) = 1.70E-14
Q1100+772	11 04 13.7000	+76 58 58.00	V = 15.7 +/- 0.2, F(1200) = 1.40E-14
PG1259+593	13 01 12.9000	+59 02 7.00	V = 15.84 +/- 0.2, F(1700) = 1.10E-14
HE0153-4520	01 55 13.2000	-45 06 12.00	V = 15.65 +/- 0.5, F(1200) = 1.90E-14
HS1102+3441	11 05 39.8000	+34 25 34.00	V = 15.9 +/- 0.2, F(1700) = 1.20E-14
TON236	15 28 40.7000	+28 25 31.00	V = 16.4 +/- 0.2, F(1200) = 1.50E-14
PG0003+158	00 06 0.2640	+16 09 48.00	V = 16.4 +/- 0.2, F(1700) = 1.00E-14
RXJ2154.1-4414	21 54 51.0000	-44 14 6.00	V = 15.8 +/- 0.5, F(1200) = 1.50E-14
3C57	02 01 57.1000	-11 32 33.00	V = 16.4 +/- 0.2, F(1200) = 1.20E-14
3C263	11 39 57.0000	+65 47 49.00	V = 16.3 +/- 0.2, F(1200) = 7.00E-15

Observing Summary:

Target	Config Mode and Spectral Elements	Flags	Orbits
PKS0405-123	COS/FUV Spectroscopic G130M		5
	COS/NUV Spectroscopic G230L		
PKS0405-123	COS/FUV Spectroscopic G160M		5
HE0226-4110	COS/FUV Spectroscopic G130M		3
	COS/NUV Spectroscopic G230L		
HE0226-4110	COS/FUV Spectroscopic G160M		3
PG1116+215	COS/FUV Spectroscopic G130M		4
	COS/FUV Spectroscopic G160M		
PG0953+414	COS/FUV Spectroscopic G130M		4
	COS/FUV Spectroscopic G160M		
PHL1811	COS/FUV Spectroscopic G130M		3
	COS/FUV Spectroscopic G160M		
HE0238-1904	COS/FUV Spectroscopic G130M		3
	COS/NUV Spectroscopic G230L		
HE0238-1904	COS/FUV Spectroscopic G160M		3
PKS1302-102	COS/FUV Spectroscopic G130M		5
	COS/FUV Spectroscopic G160M		
PG1001+291	COS/FUV Spectroscopic G130M		5
	COS/FUV Spectroscopic G160M		
Q1100+772	COS/FUV Spectroscopic G130M		3
Q1100+772	COS/FUV Spectroscopic G160M		3
PG1259+593	COS/FUV Spectroscopic G130M	CVZ	4
	COS/FUV Spectroscopic G160M		
HE0153-4520	COS/FUV Spectroscopic G130M		4
	COS/FUV Spectroscopic G160M		
HS1102+3441	COS/FUV Spectroscopic G130M		3
	COS/NUV Spectroscopic G230L		
HS1102+3441	COS/FUV Spectroscopic G160M		3
TON236	COS/FUV Spectroscopic G130M		3
TON236	COS/FUV Spectroscopic G160M		3
PG0003+158	COS/FUV Spectroscopic G130M		4
PG0003+158	COS/FUV Spectroscopic G160M		5
RXJ2154.1-4414	COS/FUV Spectroscopic G130M		3
RXJ2154.1-4414	COS/FUV Spectroscopic G160M		3

Dr. James C. Green

COS-GTO: COOL, WARM AND HOT GAS IN THE COSMIC WEB AND IN GALAXY HALOS

Target	Config Mode and Spectral Elements	Flags	Orbits
3C57	COS/FUV Spectroscopic G130M		4
	COS/NUV Spectroscopic G230L		
3C57	COS/FUV Spectroscopic G160M		4
3C263	COS/FUV Spectroscopic G130M	CVZ	4
	COS/NUV Spectroscopic G230L		
3C263	COS/FUV Spectroscopic G160M	CVZ	4

Total prime orbits: 100

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