Hubble Space Telescope

Cycle 16 AR Proposal

# Lyman continuum Absorption and the IGM Opacity at low Redshifts

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Scientific Category: QUASAR ABSORPTION LINES AND IGM

Scientific Keywords: DAMPED LYMAN-ALPHA ABSORPTION SYSTEMS, INTERSTELLAR AND INTERGALACTIC MEDIUM, LYMAN-ALPHA FOREST CLOUDS, METAL ABSORPTION SYSTEMS

Total Budget Amount: $79,513

## Abstract

We will measure the amount of Lyman continuum absorption in the universe at $0.5 < z < 2.5$ three times more accurately than currently published results, which have errors of 30%. We will work with FOS high dispersion spectra of 134 QSOs, FOS low dispersion spectra of 42 QSOs, STIS low dispersion spectra of 79 QSOs and ACS spectra of 36 QSOs. We expect to detect approximately 155 Lyman limit absorption systems (LLS) towards these QSOs. Published work uses approximately 17 LLS at these redshifts from HST spectra. The list of LLS have many uses, since these systems are amongst the best places to measure ionization and abundances, they include likely COS targets. We will derive the LLS density, per unit redshift, which is a key input to calculations of the intensity of the cosmic UV background. We use the optical depths in the Lyman continuum, and fits to Lyman series in the best spectra, to obtain the distribution of the H I column densities of the LLS, and especially the partial LLS with optical depth $< 1$. The UV background is required to understand the ionization of the intergalactic medium and the gas in the outer regions of galaxies that causes QSO absorption lines. It is also needed to run realistic simulations which are the key to understanding the IGM and QSO absorption systems.

## Investigators:

| | Investigator | Institution | Country |
|---|---|---|---|
| PI | Dr. David R. Tytler | University of California - San Diego | USA/CA |
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Number of investigators: 2

## Dataset Summary:

| Instrument | No. of Datasets | Retrieval Method | Retrieval Plan |
|---|---|---|---|
| FOS | 500 | FTP | ftp 50 per day |
| STIS | 80 | FTP | ftp all at once |
| ACS | 36 | FTP | ftp all at one time |