METAL ABSORBING GAS IN QUASAR SPECTRA
MAGIQ WITH CLOUDY

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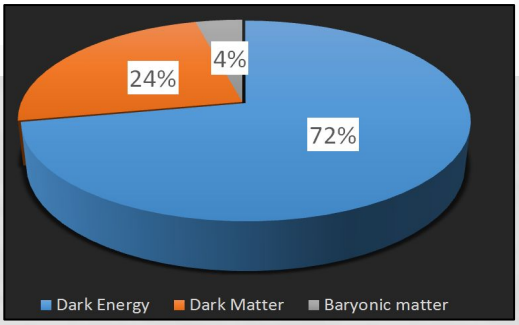
Introduction:

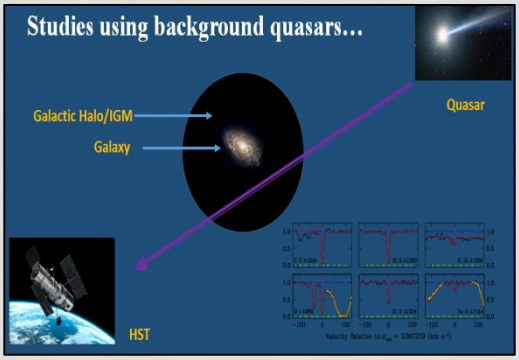
In the present universe (z ~ 0), only 10 % of matter has collapsed to form luminous matter inside galaxies. 90% is in the extended halo surrounding galaxies and the IGM. Simulations tell us that a large fraction of this gas is shock-heated to 100,000 K - 10 million K temperature. In this project, our aim is to calculate baryonic energy density associated with metal absorbers at low redshift .



Data:

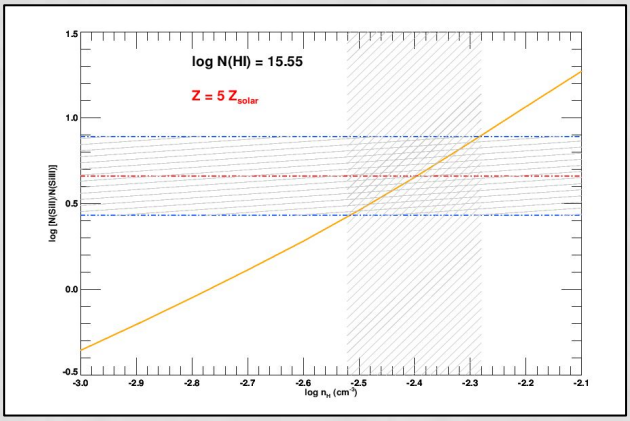
74 QSO sightlines between z=0.0 to 0.5 from HST/COS has been selected with measured values of observed column densities of the following ions:

Metal Type	Metal Column Density			HI Column Density			Sample Size
	Mean	Median	Error	Mean	Median	Error	
SiII	13.21	13.27	0.157	16.02	15.38	0.126	24
SiIII	12.55	12.55	0.167	14.44	14.31	0.223	32
CII	13.44	13.71	0.206	15.64	15.36	0.14	14
CIV	13.66	13.74	0.123	14.78	14.52	0.179	68



Photoionization with CLOUDY:

- The cloud, assuming it to have solar metallicity, is illuminated with Khaire & Srianand (2015) ultraviolet background with 2% escape fraction from galaxies.
- Grids of photoionization models is computed using CLOUDY (version 13.03) for a range of total hydrogen density (from log n_H = -5.0 to log n_H = -2.0)
- Modelled ratios of N(SiII)/N(SiIII) is compared with the observed column densities to constrain the total hydrogen density (n_H (cm^{-3})) of the gas cloud.



Results:

- From the observed log N[Si II]/ N[Si III] column density ratio, we calculate the total hydrogen density (n_H) to be **$-2.50 < \log n_H < -2.30$ (cm^{-3})**
- The metallicity for the cloud is **$1 < Z\ (Z_{solar}) < 5$**
- Observed baryon density: **Ω_b** associated with Si = **0.2 %** of total baryons.