

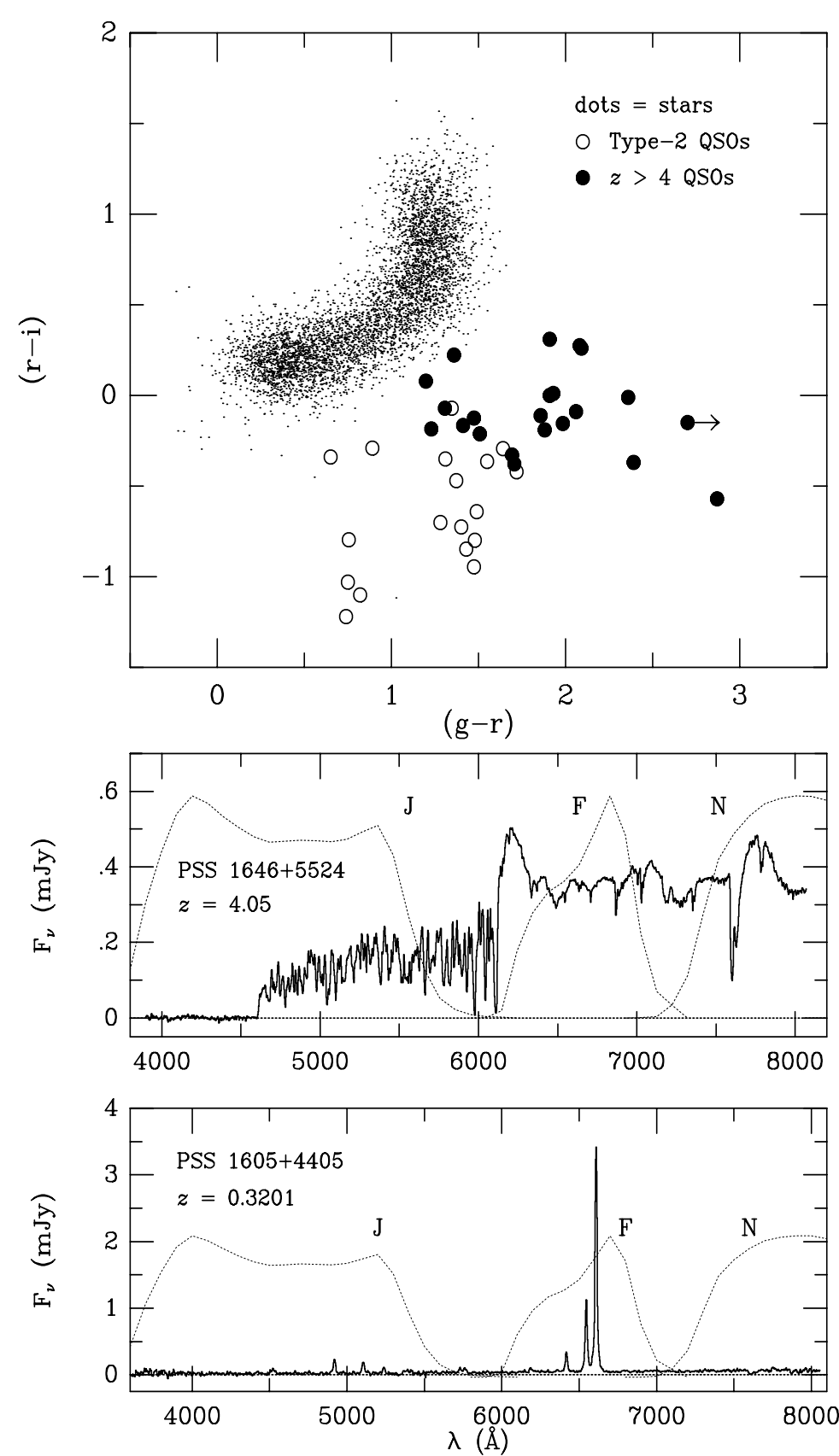
Keck Spectropolarimetry of Type-2 Quasars from DPOSS

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Introduction

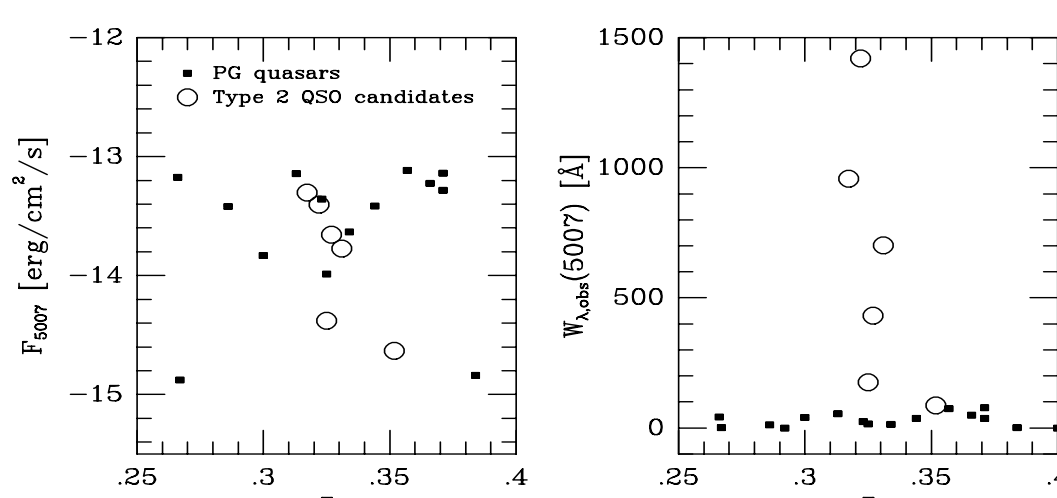
We present Keck spectropolarimetry of a sample of optically selected type-2 quasars from the Digital Palomar Observatory Sky Survey (DPOSS). We discovered the sample as contaminants in our search for $z > 4$ quasars, as outliers in gri color space. The stellar locus and a few $z > 4$ quasars and type 2 quasars are shown in figure below.

It is when the strong [O III] lines are in the r band that the resulting color signature for a type 2 mimics that of a $z > 4$ quasar. The width of the DPOSS r band selects the redshift range $z \sim 0.31 - 0.38$ as the H β and [O III] lines traverse the filter width. We find the surface density of the type 2s to be 0.005 - 0.01 per sq. degree down to the magnitude limit $r \sim 19$. Thus the type 2 quasars over the whole redshift range are at least as numerous, and perhaps a magnitude more numerous than the unobscured quasars.



Our objects have Seyfert 2 type spectra with strong high-ionization narrow lines, but weak continua. The median [O III]/H β ratio is ~ 11 , much higher than the typical ratio of ~ 3 separating AGNs and starbursts. The median [N II] 6583/H α ratio is ~ 0.4 placing the objects in the AGN portion of the line diagnostic diagrams. The plot below shows that the type 2 quasars have narrow line luminosities comparable to those of PG quasars suggesting comparable nuclear luminosities. Presence of polarized light indicates that the source of ionizing radiation is hidden by dust obscuration.

Radio fluxes for the sample are consistent with those of type 1 quasars. We recently obtained HST WFPC2 observations for the sample and Chandra observations are forthcoming.



Results

We find that $\sim 20\%$ of our objects are highly polarized ($>10\%$) and show an increase in polarization towards the UV. Another $\sim 30\%$ have an average polarization of $>2\%$ over $\lambda=4500$ through $\lambda = 8000$ Ang. with the polarization rising to over 5% towards the UV. The remaining objects have a very low polarization, consistent with zero polarization. Polarizations for a few of our better candidates are displayed above as a function of wavelength. The polarization percentage is seen to dip near the [O III] lines indicating that the light from the narrow lines is not polarized. However, the polarization does not go to zero near the H-beta indicating that we are seeing reflected light, thus clinching the case for hidden AGN.

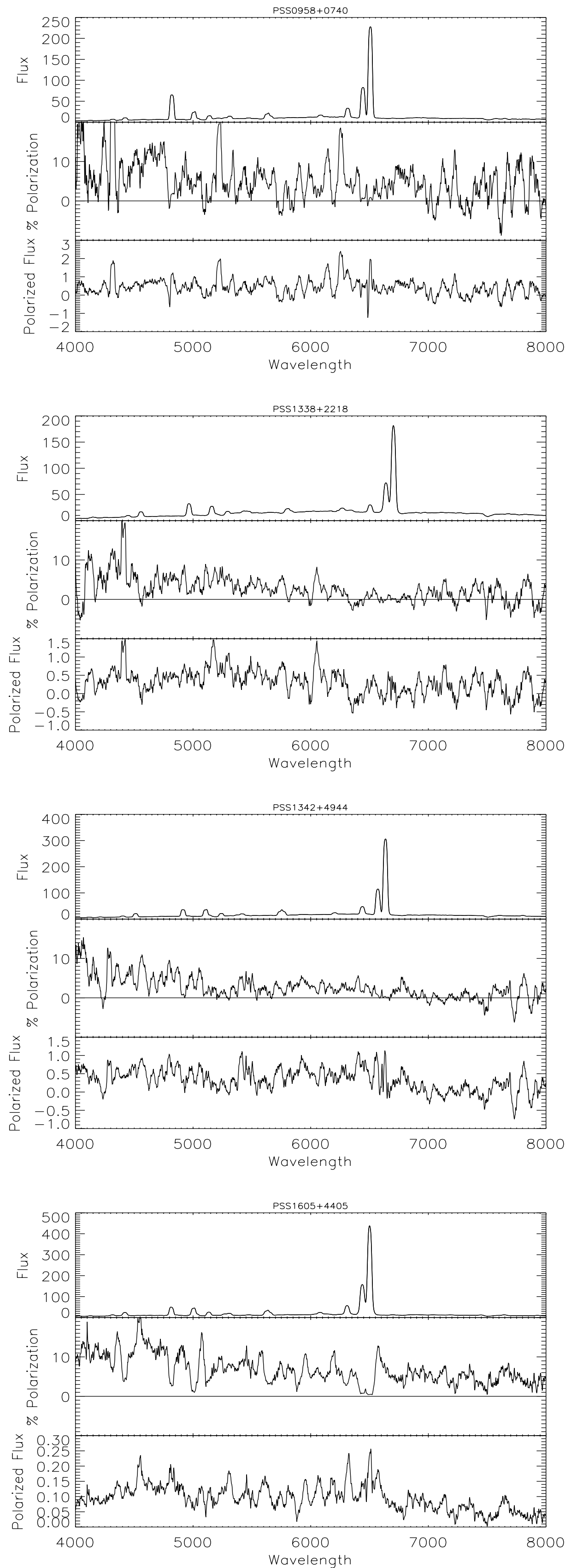


Table 1:

Object	Polarization (%)
0016+3209	< 1
0902+1640	~ 10
0946+6611	< 1
0958+0740	5-10
1146+3015	< 1
1332+2655	< 1
1338+2218	~ 5
1342+4944	~ 5
1539+4312	< 1
1605+4405	~ 10
1647+5345	~ 3
2237+1644	< 1
2237+1837	~ 3
2311+1644	5-10