setup (TI500 CCD-D1) with a focal-length reducing lens, yields about 0.58 arcseconds pixel^{-1}. The seeing is generally 2 to 3 arcseconds (FWHM) and the aperture radii generally range between 4 and 10 pixels. Also, the outer edge of the aperture generally involves fairly faint pixels relative to the core of the stellar source. For these reasons, we would estimate that the pixelation error would be rather small.

To estimate this error, we have simulated stellar images using a three dimensional Gaussian to approximate the point-spread-function (PSF). Unfortunately, a Gaussian shape tends to have far fewer counts 2 to 3 σ from the center than an actual PSF from the real data. To avoid underestimating the error I have used a fairly large 1σ radius (5.0 pixels) and aperture radii of 4.3, 5.7, 7.2, and 8.6 pixels. The Gaussian centers were chosen randomly within a given pixel and 400 simulated stars were calculated. The same code which was used to reduce the actual data was used on these simulated stars. The centroid error due to pixelation error was on the order of 0.2 pixels for the innermost radius. The mean flux errors were 0.7, 0.5, 0.3, and 0.2 percent for each radius (innermost to outermost). The error distributions were significantly non-Gaussian with peaks or spikes at various error values, especially for the two innermost radii. Since the radii are usually not at integral pixel values, this pixelation effect should vary with radius, and therefore the error can be reduced significantly by summing up multiple apertures. Summing up all four apertures on the simulated data set yielded an error on the order of 0.1%, with an error distribution much more similar to a Gaussian shape.

The QSO errors typically range from 0.5 to 2.0% per image (for 17th to 18th magnitude objects), and the brightest stars (about 15.5 mag) can have errors as low as 0.2%. Therefore, pixelation error caused by our reduction techniques can be neglected for this project.