Appendix A

Data Reduction

A.1 IRAF Parameters

The parameters we used in DAOFIND to reduce our H4RG-10-007 photometric data are chosen according to the recipe laid out in Davis [93]. In particular, for a given sky value, $s$ (in ADU), number of photons per ADU, $p$, and read noise, $r$ (in $e^-$), the expected $1\sigma$ variance in the sky will be

$$\frac{(\sqrt{s \times p} + r^2)}{p}$$

(A.1)

For our images, with $s = 2.5$, $p = 1$, and $r = 0.3$ for the combinations of dithers, we have $1\sigma = \sqrt{2.5 \times 1 + 0.3^2} = 1.609$.

Most of the parameters were kept at default. We adjusted \texttt{fwhmpsf} according to the seeing for each night. It was typically between 11 pixels and 14 pixels (larger in $g$ than in $i$ and $y$), corresponding to the 1.375-1.75 arcsecond seeing at the site. Following Davis [93], we set \texttt{psfrad} = 4.5*\texttt{fwhmpsf} and \texttt{fitrad} = \texttt{fwhmpsf}. We also adjusted \texttt{sigma} according to the number of dithers used to form the final image and the gain of the preamplifiers.

The parameter to which the finding algorithm was most sensitive was \texttt{threshold}. Several “eyeball” tests for each image were performed to determine a reasonable value for \texttt{threshold}. Fortunately, doing a few iterations of detection, psf fitting, and subtraction eliminated the need to find a perfect value for this parameter.