

#### 6.1.4 : Bad Column Correction

There are several areas of bad charge transfer on the TI500 (and on most CCDs). A single defect pixel in a given column can destroy the data on all the pixels in that column which are further from the horizontal register, since all of those pixels' charge packets must pass through the defect pixel. These areas are generally very consistent (and thus predictable) over the course of months and years.

During observations, the QSO and the comparison stars are kept away from these bad columns as much as possible. Even if the photometry apertures used for the stellar sources do not include the bad columns, the annuli used to determine the background often will. To correct the bad columns, we do a simple interpolation using several pixels on either side of the column.

### **6.2 : Calibrations**

We wish to calibrate the field orientation of the CCD field on the sky (in order to automate some of the final reductions) and calibrate the response of the system relating counts per second at zero airmass to a standard magnitude system.

#### 6.2.1 : CCD Orientation

Using a computerized form of the SAO catalog, fields containing at least 4 SAO stars in a 4.5 arcminute square were chosen. These fields were then imaged at the telescope. A multi-dimensional fit to the known SAO star positions yielded the orientation and scale of the CCD parameterized by the dispersion (pixels per arcsecond) in the row and column directions and an angle relative to North at the current epoch.

By determining these parameters on each observing run, we were able to calculate North/East offsets for the comparison stars. These numbers were later used in automating the reduction of each QSO field.