

# Massachusetts Institute of Technology

Center for Space Research

Cambridge, MA 02139

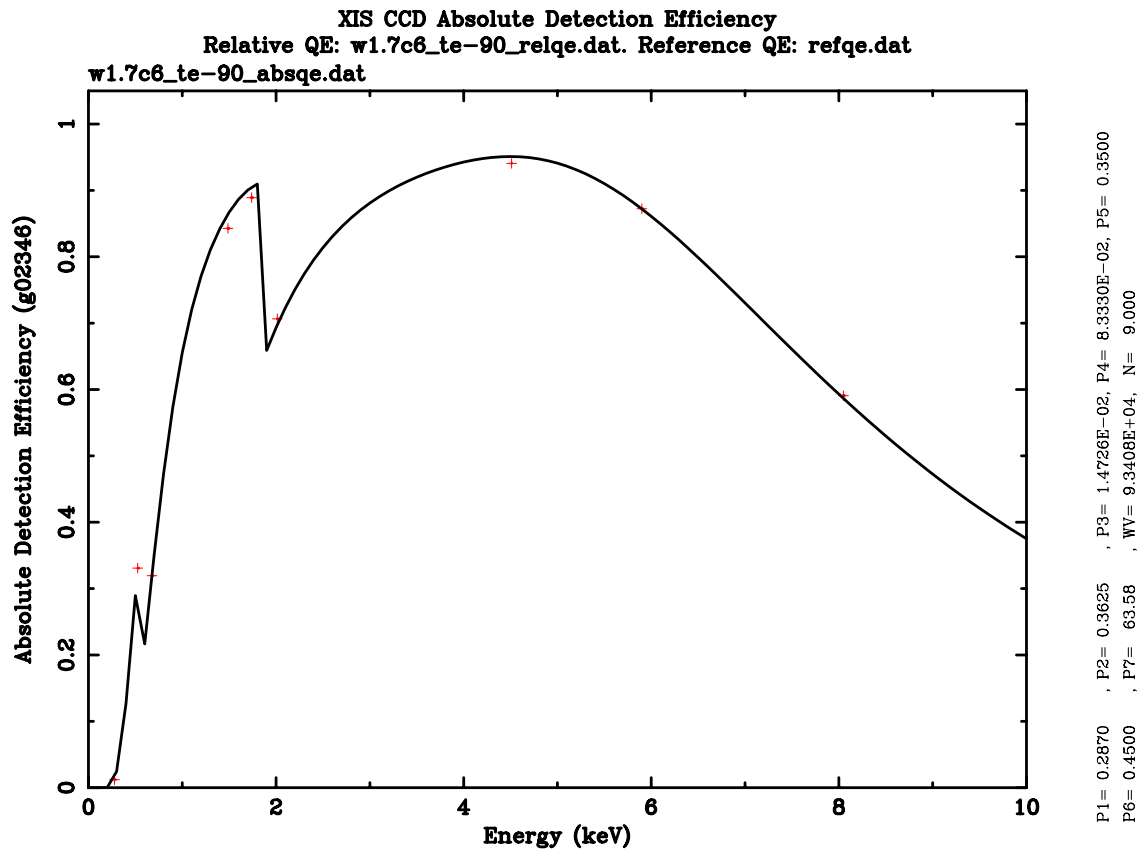
Room 37-521

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May 14, 2003

To: XIS Team  
From: Mark Bautz  
Subject: Performance summary for XIS flight candidate w1.7c6 (Lot 1, Wafer 7, chip 6) (Interim report)

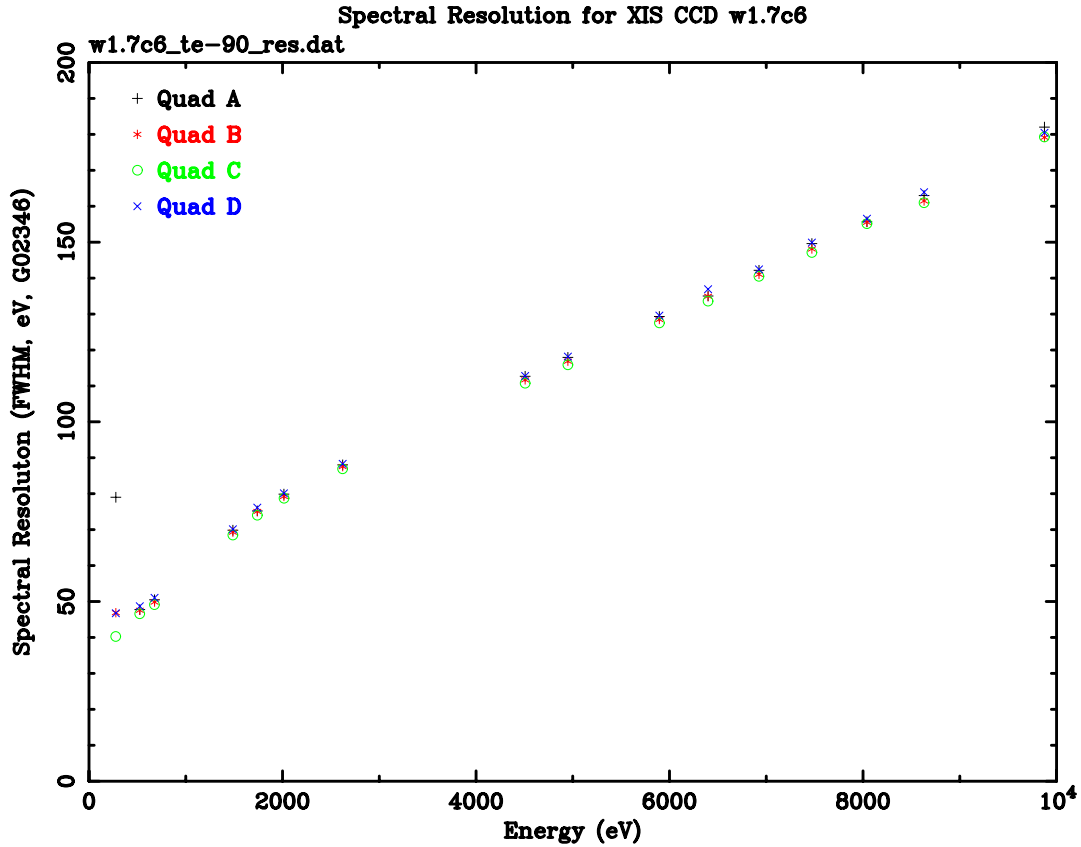
## 1 Quantum Efficiency



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Figure 1: Absolute detection efficiency (for ASCA grades g02346) for w1.7c6 at focal plane temperature  $T=-90\text{C}$  in timed exposure mode. The reference detector was w168c2. To convert relative quantum efficiency to absolute quantum efficiency, the quantum efficiency of the reference detector was assumed to be identical to its sibling ACIS detector S0 (w168c4r); this assumption is probably accurate to within a few percent. The points show the mode of the distribution of detection efficiencies in  $32\times 32$  pixel blocks over the face of the detector. The line is a “slab and stop” model of the quantum efficiency.

## 2 Spectral Resolution



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Figure 2: Spectral resolution (FWHM) vs energy for ASCA grades g02346, spatially integrated over each quadrant, under approximately uniform illumination, in timed exposure, mode at CCD temperature  $T=-90\text{C}$ . Column numbers increase going from quad A to quad D. The poor spectral resolution in quadrant A at 277 eV is thought to be an artifact of the tritium-excited X-ray source.

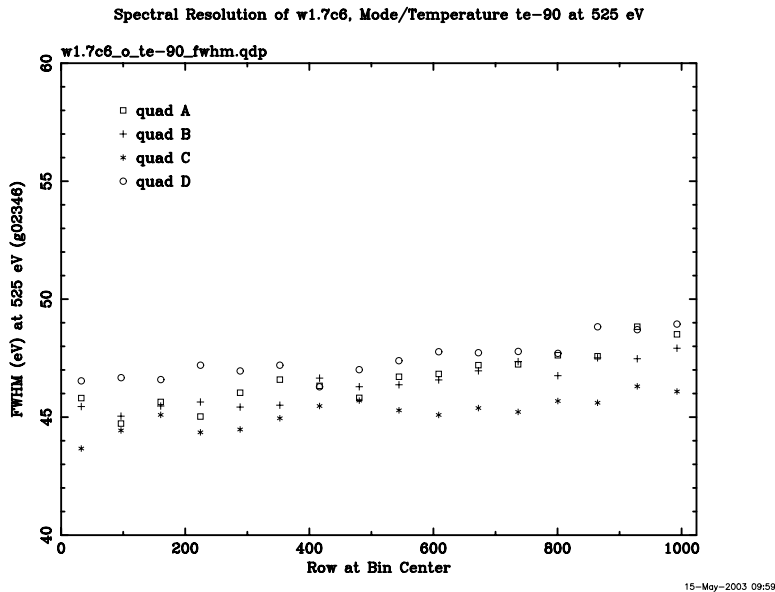


Figure 3: Spectral resolution (FWHM) at 525 eV vs row number for ASCA grades g02346, in 64-row-wide spatial bins in each quadrant, under approximately uniform illumination. CCD temperature is -90C. Charge transfer inefficiency causes FWHM to increase with row number. Column numbers increase going from quad A to quad D.

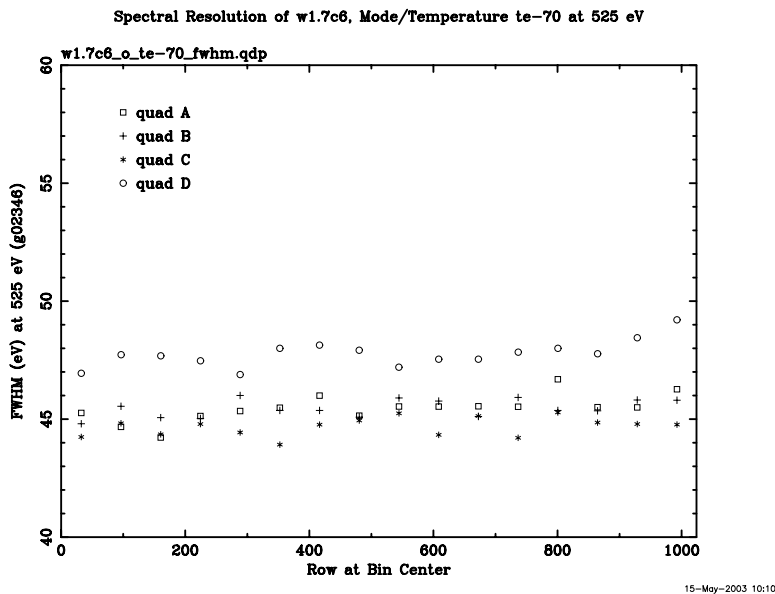


Figure 4: Spectral resolution (FWHM) at 525 eV vs row number for ASCA grades g02346, in 64-row-wide spatial bins in each quadrant, under approximately uniform illumination. CCD temperature is -70C. Charge transfer inefficiency is much smaller at this temperature than at -90C, so the spectral resolution is somewhat better, and more uniform, than at the lower temperature. Column numbers increase going from quad A to quad D. The test electronics noise level is slightly higher in quadrant D (2.4 electrons, RMS) than in the other channels (1.9 electrons, RMS), so the measured resolution is slightly worse in this channel. In the flight electronics, less channel-to-channel noise variation is expected.