# AO3 Calibration Matrix

| Standard Candles | | | | | | | |
|---|---|---|---|---|---|---|---|
| Detector | Target | Freq. ($yr^{-1}$) | No. | Time (ksec) | Observer | Objectives | Products |
| •ACIS | Cas A | 2 | 2 | 8 | Schultz<br><br><br>Plucinsky | Monitor the gain and spectral resolution of the CCDs. Used to test the newly released FEFs<br>Used to investigate the reality of a Si line in W44 | Presentation at 2002 HEAD Meeting (posted on calibration web page). New CTI-corrected FEFs (CALDB 2.18) |
| •ACIS | G21.5 | 2 | 2 | 40 | Edgar | Monitor the QE and cross-calibration with other detectors | New CTI-corrected FEFs (CALDB 2.18). Can be used to test dead time produced by charged particles. Will be done in sub-array mode from now on since full frame data is 3% piled-up. Investigate dependence on dead time correction with read out time. |
| •HRC | Cas A | 2 | 1 | 10 | Posson-Brown | Measure and monitor the QE. Cross-calibration with other detectors. | New HRC-I QE (CALDB 2.17) |
| •HRC | G21.5 | 2 | 2 | 80 | Posson-Brown | Measure and monitor the QE. Cross-calibration with other detectors. | New HRC-I QE (CALDB 2.17) |

| ACIS Spectral Response | | | | | | | |
|---|---|---|---|---|---|---|---|
| Detector | Target | Freq. ($yr^{-1}$) | No. | Time (ksec) | Observer | Objectives | Products |
| •ACIS | E0102 | 2 | 15 | 240 | Edgar | Measure effects of CTI on gain and spectral resolution. Investigate the degradation in low energy QE. ACIS-ABS validation. | Release notes and caveats (CALDB 2.18) will be posted on cal web page. Memos on the ACIS telecon web page. Observations with S0 and S5 were reduced to once per year in AO4. |
| •LETG/ACIS-I | PKS2155 | 1 | 9 | 72 | Schultz | Monitor the low energy gain on the FI CCDs. | New CTI-corrected FEFs. Removed from AO4 calibration plan. |

| HRC QE and QE Uniformity | | | | | | | |
|---|---|---|---|---|---|---|---|
| Detector | Target | Freq. ($yr^{-1}$) | No. | Time (ksec) | Observer | Objectives | Products |
| •LETG/HRC-I | HZ43 | 2 | 2 | 24 | Donnelly | Measure the low energy QE and QE map | New HRC-I QE (CALDB 2.17). Eliminated the off-axis LETG/HRC-I observation in AO4. |
| HRC-I | Coma | 1 | 1 | 10 | Donnelly | Monitor the QE map and degap map | Used to validate the HRC-I QE map. Replaced by the Vela remnant in AO4 program. |
| HRC-I | Vela | 1 | 1 | 40 | Donnelly | Measure the low energy QE uniformity | Doesn't look promising |

| HRC Small Scale Gain Variations | | | | | | | |
|---|---|---|---|---|---|---|---|
| Detector | Target | Freq. ($yr^{-1}$) | No. | Time (ksec) | Observer | Objectives | Products |
| •HRC-S | ArLac | 2 | 21 | 42 | | Measure the spatial variations in the PHA distribution across the HRC-S | Work in Progress. |
| •HRC-I | ArLac | 1 | 21 | 21 | | Measure the spatial variations in the PHA distribution across the HRC-I | Work in Progress. |

| Optical and UV Sensitivity | | | | | | | |
|---|---|---|---|---|---|---|---|
| Detector | Target | Freq. ($yr^{-1}$) | No. | Time (ksec) | Observer | Objectives | Products |
| •ACIS | Vega | 1 | 2 | 6 | Wolk | Monitor the UV sensitivity | Presentation at Calibration Workshop |
| •ACIS | Betelgeuse | 1 | 2 | 6 | Wolk | Monitor the optical sensitivity | Presentation at Calibration Workshop |
| •HRC | Vega | 1 | 2 | 6 | Zombeck | Monitor the UV sensitivity | Presentation at Calibration Workshop |
| •HRC | Betelgeuse | 1 | 2 | 6 | Zombeck | Monitor the optical sensitivity | Presentation at Calibration Workshop |

| Gratings Dispersion Relation | | | | | | | |
|---|---|---|---|---|---|---|---|
| Detector | Target | Freq. ($yr^{-1}$) | No. | Time (ksec) | Observer | Objectives | Products |
| •LETG/HRC-S | Capella | 1 | 2 | 60 | Drake | Investigate the small scale residuals in the LETG dispersion relation | Analysis in progress |
| •HETG/ACIS-S | Capella | 1 | 1 | 30 | Dewey | Monitor the HETG dispersion relation and LSF | Chip gaps remain accurate to 0.5 pixels. Memo posted on MIT HETG web page. |

| LETG/HRC-S Standard Candle | | | | | | | |
|---|---|---|---|---|---|---|---|
| Detector | Target | Freq. ($yr^{-1}$) | No. | Time (ksec) | Observer | Objectives | Products |
| •LETG/HRC-S | HZ43 | 2 | 2 | 40 | Pease | Measure QE and QE uniformity | Update HRC-S QE (Remove discontinuity at 60-80A) and QE map (CALDB 2.17). Also corrected for 0.25eV shift in energy scale in the UV ion shield transmissions. Pease etal. 2002, Proc. SPIE |

| Cross Calibration with XMM | | | | | | | |
|---|---|---|---|---|---|---|---|
| Detector | Target | Freq. ($yr^{-1}$) | No. | Time (ksec) | Observer | Objectives | Products |
| •LETG/HRC-S | PKS2155 | 1 | 1 | 30 | LETG Team | Measure cross-dispersion width, zeroth order encircled energies, and HRC-S QE map. | Memo in progress for cross-dispersion width. SPIE proceedings on QE map (Pease etal. 2002). Used to validate the QE correction at the CsI feature. |
| •LETG/ACIS-S | PKS2155 | 1 | 1 | 30 | Marshall | Cross-calibration. Low energy absorption. | Memos on ACIS telecon web page. Increase to 2 X 50ksec for AO5 |
| •HETG/ACIS-S | PKS2155 | 1 | 1 | 30 | Marshall | Cross-calibration. | analysis in progress |
| LETG/HRC-S | 3C273 | 1 | 1 | 30 | LETG Team | Monitor QE and QE map | Not as useful as PKS2155 - Removed from program in AO4 |
| •LETG/ACIS-S | 3C273 | 1 | 1 | 30 | Marshall | Low energy absorption | Memo posted on ACIS telecon page. |
| •HETG/ACIS-S | 3C273 | 1 | 1 | 30 | Marshall | Cross-calibration | analysis in progress |

| HETG/ACIS-S Effective area at different SIM Z off-sets | | | | | | | |
|---|---|---|---|---|---|---|---|
| Detector | Target | Freq. ($yr^{-1}$) | No. | Time (ksec) | Observer | Objectives | Products |
| HETG/ACIS-S | 3C273 | 1 | 2 | 50 | Marshall | Derive QE map for gratings observations at different SIM Z positions. | Presentation at calibration workshop |

| ACIS Background | | | | | | | |
|---|---|---|---|---|---|---|---|
| Detector | Target | Freq. ($yr^{-1}$) | No. | Time (ksec) | Observer | Objectives | Products |
| •HRC-I | RXJ1856 (ACIS Stowed) | 1 | 3 | 77 | Markevitch | Measure charged particle background | Memo Posted. Screened Event Files are available. |
| | | | | | Wargelin | Test mirror vignetting and imaging. | Presentation at cal workshop |

| HRMA PSF/Wings | | | | | | | |
|---|---|---|---|---|---|---|---|
| Detector | Target | Freq. ($yr^{-1}$) | No. | Time (ksec) | Observer | Objectives | Products |
| ACIS-S | Her X-1 | 1 | 1 | 50 | Gaetz | Measure Mirror scattering | Presentation at cal workshop |

| Low Energy ACIS QE Degradation | | | | | | | |
|---|---|---|---|---|---|---|---|
| Detector | Target | Freq. ($yr^{-1}$) | No. | Time (ksec) | Observer | Objectives | Products |
| ACIS-S | A1795 | 1 | 1 | 15 | Vikhlinin | Measure increase of absorption since previous observation. Test ACISABS model. | Memo posted on ACIS telecon page |
| •LETG/ACIS-S | PKS2155 | 1 | 3 | 80 | Marshall | Determine the chemical composition of the contaminant. | Memo on ACIS telecon web page. |

Total Integration Time = 912 (planned) + 266 (appended) = 1,178 ksec

• Total AO5 integration time = 990 ksec