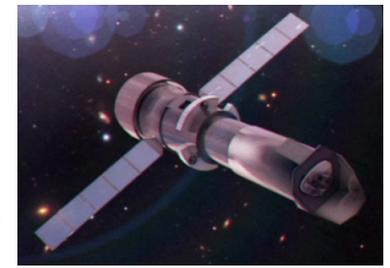# Cross Calibration with *Athena*

Cross Calibration with *Chandra*, *XMM-Newton*, *Swift*, *NuStar*, *Hitomi-reflight*, etc. :

- Instrument teams have traditionally focussed on operating and calibrating their own instrument
- Project office and/or Science Center will be responsible for cross-calibrating the *Athena* instruments to each other
- There is much to be gained by cross-calibrating the *Athena* instruments with *Chandra*, *XMM*, *Swift*, *NuStar*, & *Hitomi-reflight*. In particular, both *Chandra* and *XMM* have rich archives that observers will want and need to compare Athena results with.
- *Chandra* and *XMM* teams did not start seriously working on cross-calibration issues until about 4 years after launch
- the *International Astronomical Consortium for High-Energy Calibration* (IACHEC) was established to foster collaboration amongst the various missions, define calibration standards and develop innovative techniques, see "http://web.mit.edu/iachec/"
- U.S. community is in a good position to contribute to this effort given that most of the missions are U.S. led or have a strong U.S. component
- selection of most effective targets for cross-calibration is crucial, there is ***always*** limited time for calibration
- analysis of observations and comparison with *Chandra*, *XMM*, etc. Obviously, software from the Science Center is needed to process and reduce the Athena data

Project Examples:

- Absolute Effective Area - fluxes/luminosities from Athena will be compared to historical missions, Deep Surveys, variable sources, surveys of source populations, etc. Athena will extend these measurements to lower fluxes/luminosities
- Spectral response of the X-IFU below 1.5 keV - Chandra HETG has superior spectral resolving power below 1.5 keV than the X-IFU, HETG data will be valuable in determining the model spectra to fit to the X-IFU data

Paul Plucinsky (SAO/CXC)   AAS Meeting 1/2017