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## Chandra Calibration

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There were six releases of the *Chandra* calibration database (CALDB) during 2013. In addition to the regularly scheduled updates to the detector gains (quarterly for ACIS and yearly for the HRC), a new set of ACIS blank sky images were released, appropriate for data taken since 2009. An update to the ACIS contamination model also was released in November 2013 to account for changes over the past few years in the build-up rate, spatial distribution and chemical composition of the molecular contaminant that has been condensing onto the ACIS filters since launch. The build-up of molecular contaminant on the ACIS filters primarily affects the ACIS effective area below 2 keV. Based on periodic LETG/ACIS-S observations of blazars and ACIS imaging observations of the rich cluster Abell 1795, the condensation rate of the contaminant onto the optical filters began accelerating around 2009 and the optical depth of the contaminant has been increasing roughly linearly ever since. At about the same time, the chemical composition of the molecular contaminant also changed. These changes suggest that a different, more oxygen rich, contaminant is now condensing onto the ACIS filters. As of December 2013, the optical depth at 700 eV near the ACIS-I and ACIS-S aim-points is 1.3 (i.e., a transmission of 27%). The optical depth of the contaminant has always increased from the center to the edges of the ACIS detectors. In recent years, the difference between the optical depth at the detector edges and aim-points has accelerated. As of December 2013, the optical depth at 700 eV near the ACIS detector edges is 2.1 (i.e., a transmission of 12%). The most recent ACIS model is a pure elemental model and only includes absorption by carbon, oxygen and fluorine (i.e., the edges detected in gratings spectra) and accounts for the recent changes in the build-up rate, spatial distribution and chemical composition. A new calibration file to model the absorption was released by the CXC calibration group in the 4.5.9 release of the *Chandra* Calibration Database (CALDB) on 19 November 2013.

The *Chandra* calibration team continues to support the efforts of the International Astronomical Consortium for High Energy Calibration (IACHEC). These meetings bring together calibration scientists from all present and many future X-ray and  $\gamma$ -ray missions. Collaborations established at these meet-

ings have led to a number of cross-calibration papers published in the *Journal of Astronomy & Astrophysics*. The next IACHEC meeting is scheduled for May 12–15, 2014 in Warrenton, Virginia.