

Project Scientist's Report

Martin Weisskopf

Chandra will shortly begin its 16th year of operation and has every expectation of continuing into the foreseeable future. I want to use this opportunity to reflect on the past, look towards the future, and highlight the present. Looking deep into the past I recall the first edition of this newsletter, what was then called "AXAF News", issue number 1, September 1993. Then there were two AXAF's (Yes, the Advanced X-ray Astrophysics Facility) before it was renamed to *Chandra* at launch time in 1999. AXAF-I (for imaging) was conceptually very similar to *Chandra* today with a few major differences such as low earth orbit, servicing, and 6 mirror pairs. AXAF-S (for spectroscopy) was similar in concept to some of the instrumentation about to launch on ASTRO-H. We wish the scientists involved all the best for their upcoming mission. 1993 saw the first Users' Committee Meeting chaired by Fred Seward and comprised of Jill Bechtold, J.P. Caillault, Webster Cash, Lynn Cominsky, Kathryn Flanagan, Steve Kahn, Rich Kelley, Joe Patterson, Craig Sarazin, Hy Spinrad, Allyn Tennant, and Mike Watson.

With no new major U.S. X-ray-astronomy facility planned to launch before ESA's Athena in the late 2020s, the entire *Chandra* Team recognizes both the importance of maintaining *Chandra*'s unique science capabilities for at least another decade and also preparing for the future. As the Observatory ages, three issues—thermal, contamination, and radiation—are resulting in graceful degradation of the science performance, although we may have to once again consider the pros and cons of attempting a bakeout of the ACIS filters.

Turning to the future, the X-ray community is invigorated by NASA's Astrophysics Director's (Paul Hertz) call to pursue the question as to what flagship missions should NASA bring to the 2020 Decadal Survey. In a white paper he released this past year, an X-ray Surveyor with capabilities beyond those of *Chandra* was listed as a possible candidate. Accordingly, a subset of the *Chandra* team has organized an Informal Science Definition Team and initiated preliminary Mission Concept Studies with MSFC's Advanced Concepts Office to provide input over the next several months to the Physics of the Cosmos Program Advisory Group in support of such a mission. We envisage this facility to have angular resolution at least

as good as *Chandra*, and effective area of about 2.5 square meters with ~ 1 arcsec resolution over a 5 arcmin \times 5 arcmin field of view. We trust that those members of the community that especially feel the impact of the number of detected photons on their research will rally around this concept.

I would like to close by mentioning a new *Chandra*/HST result that is soon to be published in *Science*: "The Non-Gravitational Interactions of Dark Matter in Colliding Galaxy Clusters" by D. Harvey, R. Massey, T. Kitching, A. Taylor, and E. Tittley. Not only does this work, which blends results from *Chandra* and HST, show the awesome synergy that derives from NASA's Great Observatory Program, but it also leads us deeper into the mysterious physics of the Dark Matter, which pervades the Universe.