

Chandra Cool Targets (CCT, formerly CATs)

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Most readers of this Newsletter are aware that there are significant restrictions on the length of a single *Chandra* observation for a given pitch angle. The pitch angle is the angle between the viewing direction of *Chandra* and the direction to the sun. These restrictions are necessary to avoid the overheating of various observatory subsystems and are described in detail in the Proposer's Observatory Guide (POG) Section 3.3.3.

The scheduling of *Chandra* targets must simultaneously satisfy any science-driven constraints on the observations (e.g., must be done within a specific time window) and the requirement to keep various subsystems within operational thermal limits. The final schedule for any given week is a delicate balance of heating and cooling: if a target is constrained to be observed at a hot pitch such that the temperature of a particular subsystem approaches the operational limit, a target at a cool pitch must be observed directly afterwards to lower the subsystem temperature. Sometimes it is necessary to pre-cool a particular subsystem before observing a target at hot pitch. To date, it has been possible to schedule targets while maintaining subsystem temperatures within operational limits, without impacting observing efficiency, in other words, *Chandra* has never been pointed at a random patch of sky to “cool off” because a cool pitch target was not available. However, the thermal constraints are becoming more restrictive as the multi-layer insulation on *Chandra* continues to degrade. To avoid future impacts on observing efficiency, the CXC Director, in consultation with MSFC Project Science and the *Chandra* Users Committee, authorized a White Paper call for *Chandra* Cool Targets (CCT).

The call for white papers was issued on Friday 21 September 2018 and originally referred to Cool Attitude Targets (CATs), but we quickly realized that the acronym "CATs" is easily confused with sources in the *Chandra* Source Catalog, and switched to *Chandra* Cool Targets (CCT) for clarity. The response to the CCT call was very enthusiastic: a total of 41 White Papers were submitted by the deadline of October 22 2018. A series of four mini-reviews, based on science topic, were held between December 2018 and February 2019. The panelists were comprised of scientists from the CXC, MSFC and outside experts. The committees were asked to recommend which programs were likely to return excellent science, and to assign a priority (1, 2 or 3, with 1 being the highest priority) to each accepted program. Twenty two programs were approved, ten at priority 1, seven at priority 2 and five at priority 3. There are

approximately 21,000 CCTs, with good sky coverage. The first CCTs were scheduled in January 2019.

The aim of the CCT program is to ingest a large pool (many thousands) of targets distributed across the sky (but avoiding the ecliptic poles) so that a cool target is always available for mission planning. The database of CCTs is maintained by the science mission planning group. CCTs are inserted into the schedule if no GO or GTO targets are available at a required cool pitch angle. The review-assigned priority of approved CCT programs will be used in the event that more than one CCT can provide the required spacecraft cooling (i.e., priority 1 will be picked over priority 2 or 3). Since there is no guarantee that a particular CCT will be picked for scheduling, GO and GTO observers can apply for CCT targets to address their own science in response to the annual Call for Proposals. If a GO/GTO proposal for a specific CCT is approved, it will be deleted from the CCT database.