Report from NICER Users Group meeting - June 2022

The NUG heard updates from the NICER team on June 20, 200 and met on June 21, 2022 for additional discussion. The NUG discussions included analysis software, calibration, growing the NICER community and NICER's Diversity, Equity, Inclusion and Accessibility efforts. Summaries of the discussion in each area, and suggestions to the team follow.

Analysis software & data distribution

The NUG was happy to hear of the updates to be released in HEASOFT v6.31 including background models, auto-filtering of noisy detectors, and the high-level product script to produce spectra and light curves. All these are very welcome improvements that will help new NICER users with analysis. We thank the NICER team for their hard work in developing these updates.

The NUG was pleased to see the recent continued improvements of the Data Analysis Threads, but encourages continued improvements and revision to current threads and development of new ones. Making the threads more comprehensive and end-to-end (including assuming less knowledge of X-ray analysis) will be a big benefit to helping students become involved in NICER analysis, as well as those from a wider scientific community. This will also benefit DEIA efforts (see later).

There is a lot of great information and walkthroughs that were presented at the April 2021 NICER workshop. One quick way to help users would be to time-stamp those videos so viewers can quickly jump to the relevant place, and then also linking to the workshop videos from the analysis threads, or alternatively creating a YouTube playlist with the most important threads.

Calibration

The NUG was happy to see the integration of background models within HEASOFT, and the development of the SCORPEON background model that can be fit within xspec is a welcome independent approach.

It might be helpful to describe the importance of the low-energy shelf of the response in the case of analyzing high N_H sources.

Growing the NICER user community

Comments from the Senior Review encouraged NICER to continue to grow its user community. The NUG spent a significant amount of time discussing this issue and trying to help come up with additional things that the NICER team can do. Chiefly, we recommend continuing to publicize how NICER can do much more than just neutron stars and X-ray binaries. The

development of OHMAN can be used to draw in the broader transient community. Continuing to develop additional joint programs with other missions/telescopes is also a good route to widening the community.

The NUG was pleased to hear of the upcoming NICER workshop that will have both hands-on analysis for novice users and highlight scientific results - the more results outside the fields of neutron stars and X-ray binaries that can be presented, the better. It would be helpful to have a significant presence at other big meetings too, for instance, having splinter sessions at AAS meetings, or organizing a session at the next COSPAR meeting in 2024 (the advantage of these options is that the logistics are handled by others and the team can focus on just the scientific organization).

Additional ways that could be used to promote NICER science results to the broader community include a more prominent social media presence, e.g., tweeting the ISS science nuggets, and getting features on websites such as astrobites.org.

NICER's DEIA efforts

The NUG was pleased to see that NICER is part of a wider GSFC Diversity, Equity, Inclusion & Accessibility effort, and believes that NICER does a really excellent job of giving opportunities to younger scientists. The NUG had several suggestions for other actions that the NICER team could consider to enhance its DEIA efforts. For instance, having a DEIA statement on the NICER website; building up and keeping good demographic records (is it possible to gather demographics from proposal information?); sending representatives from the NICER team to the SACNAS and NSBP conferences; and providing funding for underrepresented researchers to attend workshops.

Any actions that make the analysis of NICER data more straightforward for novice users will also benefit DEIA efforts since newer users (e.g. undergraduate and graduate students) typically include researchers from a more diverse range of backgrounds. For example, continued work on improving and expanding the analysis threads can have additional benefits including helping with DEIA efforts and growing the NICER community.

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