The 2022 PhysPAG Executive Committee

Chair
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Justin Finke
Ryan Hickox
Sean McWilliams
Bindu Rani
Vera Gluscevic
Andrew Romero-Wolf
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Athina Meli
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Smithsonian Astrophysical Observatory
U.S. Naval Research Laboratory
Dartmouth College
West Virginia University
NASA Goddard Space Flight Center / SURA / KASI
University of Southern California
Jet Propulsion Laboratory
Louisiana State University
UMBC / NASA Goddard Space Flight Center
North Carolina Agricultural & Technical State Univ.
Trinity University

Chair Emeritus

Vice Chair

New Members!

PCOS NASA Colleagues

PS
Valerie Connaughton

DPS
Sanaz Vahidinia

CS
Brian Williams
Jake Slutsky
Stephanie Clark

Currently Active Science Interest Groups

X-ray SIG
Inflation Probe SIG
Gravitational Wave SIG
Gamma Ray SIG
Cosmic Ray SIG
Cosmic Structure SIG
PhysPAG Activities (since the October 2021 APAC)

Astro2020 Released 😐 JWST Launched 🎉

(Virtual) **Gamma & Cosmic Ray SIG meetings** in lieu of (canceled) AAS Winter meeting

PhysPAG EC Review of the **PCOS Technology Gap List**

Large (160 person) event at **AAS HEAD 19** (Pittsburgh + Virtual)

Expanding Participation in Astrophysics efforts (see Ryan Hickox’ talk)

Proposed creation of new SAGs (New Great Observatories, TDAMM)

**GRSIG Meeting** at forthcoming April APS Meeting (NYC)

**Multiple PhysPAG Activities** at forthcoming AAS Meeting (Pasadena)
X-Ray SIG at HEAD 19

A Community discussion on the future of X-ray astronomy in the wake of Astro2020

12pm : Ryan Hickox  
12:10pm : Rob Petre  
12:20pm : Randall Smith  
12:30pm : Discussion

Welcome & Introduction  
Thoughts on the future of X-ray Astronomy  
An update on Athena  
Enabling technologies, opportunities, & challenges  
A MODERATED PANEL DISCUSSION FEATURING  
ANNA ORGOZALEK, ERIN KARA, KRISTIN MADSSEN,  
PAUL RAY, & SIMON BANDLER

ZOOM LINK: https://tinyurl.com/ycy3bj28

Meeting recording available here

160 people!
The 2020 Decadal Survey in Astronomy & Astrophysics has placed pursuit of a new constellation of GREAT OBSERVATORIES as the top national priority for the future of space astrophysics.
The NASA GREAT OBSERVATORIES Science Analysis Group Report, heavily cited by Astro2020, provides an account of how these four missions changed our country, the world, and our understanding of everything beyond it.

READ THE REPORT NOW AT

WWW.GREATOBSERVATORIES.ORG
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2.4. Fundamental Physics

3. CAPABILITIES, FACILITIES & OPTIONS

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4. REFERENCES

NASA’s Great Observatories (Hubble, Chandra, and Spitzer, Fig. 1-1) have opened up the electromagnetic spectrum from space, providing such vast access to wavelengths not visible, or greatly compromised, from the ground due to Earth’s atmosphere. The first, Hubble, was launched in 1990, and two of the other (Hubble and Chandra) are still operating today. Each of these observatories delivered large gains in sensitivity, angular resolution, mapping speed and/or spectral coverage. Together, they have provided the scientific community with a flexible and powerful suite of technologies capable of addressing broad scientific questions, and reacting to a rapidly changing scientific landscape. Through regular peer-reviewed proposal calls to the community, this has become a central feature of modern astrophysics, where effects are now routinely observed across the electromagnetic spectrum from the ground and space. It has also become the basis upon which multiple generations of students and post-doctoral scholars have built their careers. However, the concept of the Great Observatories was not an inevitable outcome of a system where communities vied and competed for a share of the limited resources available for new missions.

Fig. 1-1. The Great Observatories. Hubble, Chandra, and Spitzer, arranged according to the part of the electromagnetic spectrum they observe.

The concept of the Great Observatories took shape in the late 1970s as scientists and NASA administrators recognized that fundamental studies in astrophysics required access to the entire electromagnetic spectrum, well beyond what could be accessed from the ground, and any single space observatory could deliver. The article “The Need for an Open Atmospheric-Window Telescope” (Harwit, 1973) served as inspiration first for Frank Martin and later Charlie Pellegrin, who succeeded Martin as Astrophysics Division director in 1983 and initiated the study of the Great Observatory concept. By then, Hubble and Compton were already approved, and the key issue was how to get support and funding for AXAF and BFR (later Chandra and Spitzer, both highly ranked by the 1980 Decadal review), which would open up the X- and Infrared windows, respectively, so that they could be launched and be operational well before the HST and CGRO missions were over. The Astrophysics Council, formulated by Pellegrin in 1983 and chaired by Harwit, was charged with sketching out a bold astrophysics program that would require all four observatories.
A PITCH TO THE APAC

THE NEW GREAT OBSERVATORIES
SCIENCE ANALYSIS GROUP
A proposed **Joint-PAG SAG** in response to Astro2020

**Inclusive and open.** We want a broad, diverse subset of the community to participate

In some ways, this is a “sequel” to SAG-10 in the wake of Astro2020’s Great Observatories Mission & Technology Maturation Program **Recommendation**
1. Identify key questions left unanswered by today’s space astronomy missions, building on the SAG-10 report

2. Synthesize notional science cases for a future fleet of New Great Observatories, specifically those recommended to enter Astro2020’s Maturation Program (i.e. IR/O/UV, X-ray, FIR)

3. Identify important questions not raised by Astro2020 (or the four Large Mission Study Reports) that can be addressed by multi-wavelength observations.

4. Identify science gaps that might be close should these observatories enjoy contemporaneous flight
1. Are existing NASA community funding mechanisms meeting the needs of TDAMM science? Are studies quantifying projections for future missions supported through current means? If gaps are identified, what scientific or technical advances are limited by these gaps? (Abridged)

2. Are event alert mechanisms being supported and built (by NASA or even NSF w.r.t. Rubin) sufficient for coordination between future ground and space facilities? What gaps exist?

3. What are key space-based wavelengths for multi messenger astronomy? What are the key capabilities necessary across wavelength ranges? What types of mission and mission scales, within Astro2020’s recommended funding envelope, could accomplish these science requirements?
PhysPAG, ExoPAG, and COPAG are **energized and ready to work** in the wake of Astro2020. We are ready to help with, e.g. **Analyses of Alternatives** that must be commissioned. We can explore questions like:

- How do decadal recommendations differ from input recommendations of large mission concepts?

- **Have any of the goals or science objectives put forth in the recommended mission's study been modified by the Decadal Survey?**

- **Have any of the technologies or methods in the recommended mission's study been modified by the Decadal Survey?**

- Are the mission goals separable in a way such that some of the science could be achieved quicker or more cheaply by multiple missions?

- Are there mission technologies or concepts of operation that could be simplified or significantly changed with better knowledge of some aspect of astronomy or astrophysics before any mission study were to start?

- **What alternative methods exist for achieving any of the mission goals?**