

Python in Heliophysics Community Fall 2022 Meeting

November 7th, 2022 - November 10th, 2022

Meeting materials are located at <http://heliopython.org/meetings/>

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Participants

73 people registered to participate in the virtual Fall 2022 meeting via the meeting's Google sign up form. Meeting participants' home institutions (as indicated by responses to the Google sign up form) included the following:

- JHU APL
- NASA GSFC
- LASP
- Southwest Research Institute
- University of New Hampshire
- UCLA
- Boston University
- LMSAL
- Center for Astrophysics | Harvard & Smithsonian
- UTSA/SwRI
- Orion Space | NASA/GSFC
- PyHC :)
- University of Edinburgh, UK
- Tpz for ESA
- George Mason University
- Astronomical Institute of Charles University
- Stoneris
- Bulgaria acadmey of science
- NASA GSFC SPDF
- Self interest. Did research at NASA Goddard.
- LASP/CU Boulder
- UC Berkeley | SSL
- Universidad Nacional de Colombia
- United States Naval Academy
- ESA
- NSO/CU-APS
- NASA GSFC / SDAC
- National Research and Innovation Agency (BRIN)
- Arizona State University
- Orion Space Solutions
- NRL
- GMU
- NASA GSFC/CCMC
- SwRI Boulder
- NextGen Federal Systems
- GSPL
- ARISA Lab
- GATS
- Bulgaria Academy of Sciences

- American University
- Institute of Astronomy with NAO
- Cairo University
- Observatoire de Paris

Meeting Overview

The Fall 2022 meeting was spread over a four-day period, where each day spanned a two-hour period (from 9 AM - 11 AM MT). As with prior virtual meetings, the meeting organizing committee chose to use the Zoom platform as Zoom is familiar to PyHC members (it is already in use for the bi-weekly PyHC telecons), it consistently provides good quality video and sound, and it lends itself nicely to large group video calls and breakout rooms. Days 1, 2, 3, and 4 were recorded, with videos uploaded to [the meeting web page](#) at the end of the meeting, as well as to the PyHC YouTube channel ([see here](#)). [General conference notes](#) were taken by the PyHC group as a whole. All presentation slides were collected and put into the [Presentations folder](#) on the meeting's Google Drive.

The meeting began Monday, November 7th, and ran through Thursday, November 10th. Content of each day was as follows:

- Day 1: Package overview/intros (HAPI, Kamodo, lasp_packet, and SkyWinder) and larger initiatives (MOSS, SPASE, and TOPS).
- Day 2: Cloud and website updates (HelioCloud Update and Jupyter Book gallery implementation), pip and conda-forge overview, and a PyHC cross-project work presentation.
 - The final presentation was broken down into four parts
 - End Product (what was done & delivered to the community for SunPy, SpacePy & HAPI)
 - Lessons Learned (best practices, traps, and how to do this kind of cross-package work when you're working in someone else's project)
 - Future Work/Adapters Needed (open call for discussion by participants)
 - Open Discussion
- Day 3: Tutorial (Writing a model reader for the redesigned CCMC Kamodo structure) and Hackathons (Deploying Jupyter book to PyHC Gallery and Crafting PlasmaPy notebooks)
- Day 4: Various overviews and discussions (HITS and WxMLP, PyHC website URL stuff (http/https) and Organizational DOI, Promoting open science with COSPAR/ISWAT information architecture working group and IHDEA (overview and update), a potential CSSI proposal, and a post-TESS panel discussion), plus a meeting wrap-up.

Conclusions

The Fall 2022 meeting was a success. There were no schedule gaps where there were not enough topics to fill a session, as has happened in some past virtual meetings, the time frame was appropriate for presentations, hackathons, and discussions, the topics were relevant and of interest to meeting attendees, and meeting attendees actively participated in all the planned activities. Once more, the virtual format of a four-day meeting for two hours per day worked well for this group. The core of the meeting was focused on PyHC project integration and interoperability, as well as updating the community on current efforts within the PyHC community. This was more of an update meeting as opposed to a meeting where we expected to create new deliverables or push initiatives.

The usual project overviews and introductions held at the PyHC bi-annual meetings were well received. In the future, having a bit more time after presentations for discussion and discussions of how each project can fit into the overall PyHC interoperability initiative is desired. More thoughts on these can be found in the [General conference notes](#) page, including sidebar discussions and links to related content. One session which saw an especially large amount of interaction and discussion was the post-TESS panel discussion. At the TESS 2022 meeting itself, technical difficulties led to the inability to hold the panel discussion. Instead, it was held during this meeting, with the ability to add in more interactivity from the crowd via the use of Miro board software. This allowed everyone in the meeting to provide their thoughts on a variety of questions:

1. How do we advance the use of software tools to progress towards open science in the heliophysics and space science domains?
2. How can we address accessibility and interoperability challenges in Sun-Earth connection science?
3. What are some practical tips to handle diverse datasets (from Solar Physics to Earth science) to enable interoperability between programming languages?
4. What are the needs and requirements of the ideal shared on-line infrastructure?
5. How to handle legacy code written in older and/or closed-source languages (e.g. IDL or MATLAB), as well as simulation code/intensive calculations written in compiled languages?

Participants' answers can be seen below in Figures 1-5. This was a particularly useful setting for those who normally wouldn't speak up as much in a meeting to put thoughts to paper, and resulted in a rich discussion period. The only change to be made would be to increase the time given to this kind of collaborative exercise.

How do we advance the use of software tools to progress towards open science in the heliophysics and space science domains?



miro

Figure 1: participant answers to the question, “How do we advance the use of software tools to progress towards open science in the heliophysics and space science domains? ”

How can we address accessibility and interoperability challenges in Sun-Earth connection science?



miro

Figure 2: participant answers to the question, “How can we address accessibility and interoperability challenges in Sun-Earth connection science?”

What are some practical tips to handle diverse datasets (from Solar Physics to Earth science) to enable interoperability between programming languages?



miro

Figure 3: participant answers to the question, “What are some practical tips to handle diverse datasets (from Solar Physics to Earth science) to enable interoperability between programming languages?”

What are the needs and requirements of the ideal shared on-line infrastructure



miro

Figure 4: participant answers to the question, “What are the needs and requirements of the ideal shared on-line infrastructure?”

handling legacy code written in older and/or closed-source languages (e.g. IDL or MATLAB), as well as simulation code/intensive calculations written in compiled languages.



Figure 5: participant answers to the question, “How to handle legacy code written in older and/or closed-source languages (e.g. IDL or MATLAB), as well as simulation code/intensive calculations written in compiled languages?”

Future Work

The situation with COVID-19 has begun to noticeably improve, and ideally means that we will be able to host the PyHC Spring 2023 in-person/hybrid. If an in-person meeting is able to be held, the location will be in Boulder, CO at LASP. There will be a hybrid option for those who cannot attend in-person, and we will record non-Hackathon presentations and discussions. Regardless of the format, the meeting will occur mid-to-end of May 2023.

As for other upcoming PyHC activities, we will continue to hold approximately bi-weekly telecons (starting in January 2023 after the holiday break), as schedules allow. The next big meeting on the horizon is AGU 2022 in Chicago, IL. We have 3 sessions at AGU this year: an in-person poster session, an online poster session, and an in-person oral session. Sessions (and links) are as follows:

- [SH41C Online Poster Session: Thursday, 15 December 2022, 8 - 9 CST](#)
- [SH42E In-person Poster Session: Thursday, 15 December 2022, 9 - 12:30 CST](#)
- [SH45B In-person Oral Session: Thursday, 15 December 2022, 14:45 - 16:15 CST](#)

Final agenda

	Start Time (MDT)	End Time (MDT)	Duration	Type	Title	Presenter/Lead
Mon, Nov 7, 2022	9:00	9:05	0:05	Presentation	Welcome, Introduction, etc.	Julie Barnum
Package Overviews/Intros						
Mon, Nov 7, 2022	9:05	9:20	0:15	Presentation	HAPI Overview	Jon V., Bob W., Sandy A.
Mon, Nov 7, 2022	9:20	9:30	0:10	Presentation	Kamodo Overview	Rebecca Ringuette
Mon, Nov 7, 2022	9:30	9:45	0:15	Presentation	lasp_packet Intro	Gavin Medley
Mon, Nov 7, 2022	9:45	10:00	0:15	Presentation	SkyWinder Update	Bjorn Kjellstrand
Larger Initiatives						
Mon, Nov 7, 2022	10:00	10:15	0:15	Presentation	MOSS Overview	Kyle Murphy
Mon, Nov 7, 2022	10:15	10:35	0:20	Presentation	SPASE Overview	Shing Fung
Mon, Nov 7, 2022	10:35	10:45	0:10	Presentation	TOPS Overview	Ryan McGranaghan
Mon, Nov 7, 2022	10:45	11:00	0:15	Discussion	General discussion re the day's talks	
Cloud and Website Updates						
Tues, Nov 8, 2022	9:00	9:15	0:15	Presentation	HelioCloud Update	Brian Thomas
Tues, Nov 8, 2022	9:15	9:30	0:15	Presentation	Jupyter Book gallery implementation	Shawn Polson
pip and conda-forge Overview						

Tues, Nov 8, 2022	9:30	9:45	0:15	Present ation	pip overview	Shawn Polson
Tues, Nov 8, 2022	9:45	10:00	0:15	Present ation	conda-forge overview	Ashley Smith + others?
PyHC Cross-Project Work						
Tues, Nov 8, 2022	10:00	11:00	1:00	Present ation	SpacePy, SunPy & HAPI wrappers for internal data representation sharing	Sandy Antunes, Jon Niehof, Jeremy Faden
Time breakdown						
			0:15		End Product (what was done & delivered to the community for SunPy, SpacePy & HAPI)	
			0:15		Lessons Learned (best practices, traps, and how to do this kind of cross-package work when you're working in someone else's project)	
			0:15		Future Work/Adapters Needed (open call for discussion by participants)	
			0:15		Open Discussion	
Hackathons						
Wed, Nov 9, 2022	9:00	10:00	1:00	Tutorial	Writing a model reader for the redesigned CCMC Kamodo structure	Rebecca Ringuette and others
Wed, Nov 9, 2022	10:00	11:00	1:00	Hackath ons	Deploying Jupyter book to PyHC Gallery	Shawn Polson
Wed, Nov 9, 2022					Crafting PlasmaPy notebooks	Nick Murphy
Wed, Nov 9, 2022						
Wed, Nov 9, 2022						
Wed, Nov 9, 2022						
Various						
Thurs, Nov 10, 2022	9:00	9:20	0:20	Present ation	HITS and WxMLP	Alec Engell

Thurs, Nov 10, 2022	9:20	9:40	0:20	Discussion	PyHC website URL stuff (http/https) and Organizational DOI	Shawn Polson
Thurs, Nov 10, 2022	9:40	10:00	0:20	Presentation	Promoting open science with COSPAR/ISWAT information architecture working group and IHDEA (overview and update)	Arnaud Masson
Thurs, Nov 10, 2022	10:00	10:15	0:15	Presentation	potential CSSI proposal	Russell Stoneback
Post-TESS Panel Discussion						
Thurs, Nov 10, 2022	10:15	11:00	0:45	Discussion	Panel Discussion from TESS meeting	Various (Arnaud M lead)