Polarimeter to Unify the Corona and Heliosphere (PUNCH) Science Operations Center (SOC) Data Products and Software

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Data Products

Each data product has an associated level and product code.

- ***Level 0***: converts raw satellite data to FITS images
- ***Level 1***: basic image calibration
- ***Level 2***: polarization resolution, image merging, quality marking
- ***Level 3***: background subtraction
- ***Level Q****:* QuickPUNCH products for space weather
- ***Level L****:* QuickLook products, JPEG2000 images for preview

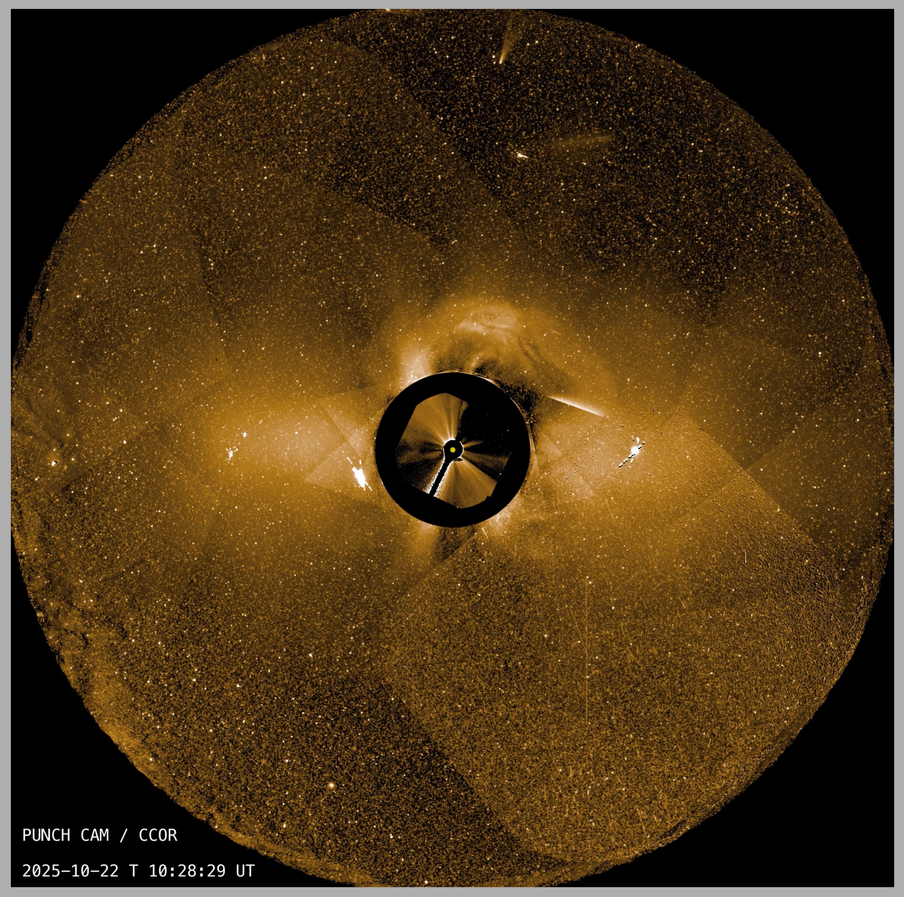
The full product code list is available in the ***punchbowl*** documentation available via GitHub. Two common products are:
L2_PTM: polarized trefoils with the F-corona still present
L3_PIM: polarized intermediate trefoils with F-corona removed but starfield present

Images are accessible from the SDAC via the VSO and SunPy's Fido.

```
from datetime import datetime
from sunpy.net import Fido, attrs

# change these two lines
start_time, end_time = datetime(2025, 10, 1), datetime(2025, 10, 2)
product_code, version = "L3_CIM", "v0g"

# the rest of this remains the same
result = Fido.search(attrs.Time(start_time, end_time),
                     attrs.Provider("SDAC_PUNCH"))
result = result[0][[i for i, r in enumerate(result[0]['fileid'])
                    if product_code in r and version in r]]
filenames = Fido.fetch(result)
```



PUNCH Data are available!

QR code takes you to the PUNCH documentation about retrieving data

Software

All code is available on GitHub.
https://github.com/punch-mission

The main science processing code is in the ***punchbowl*** repository with additional repositories:

- ***punchpipe****:* pipeline automation
- ***regularizepsf****:* general package for homogenizing point spread functions
- ***solpolpy****:* general package for converting between polarization system

We want your contributions!
We want to list all PUNCH-related software in our GitHub. Either follow the QR code or open a GitHub issue to add yours.

The PUNCH mission is an open mission. We believe data and software should be accessible without barrier. Please reach out for help if you encounter challenges using either data or software by opening a GitHub issue or email punch_soc@swri.org. Submit questions to the SOC at the QR code or tinyurl.com/punchquestion