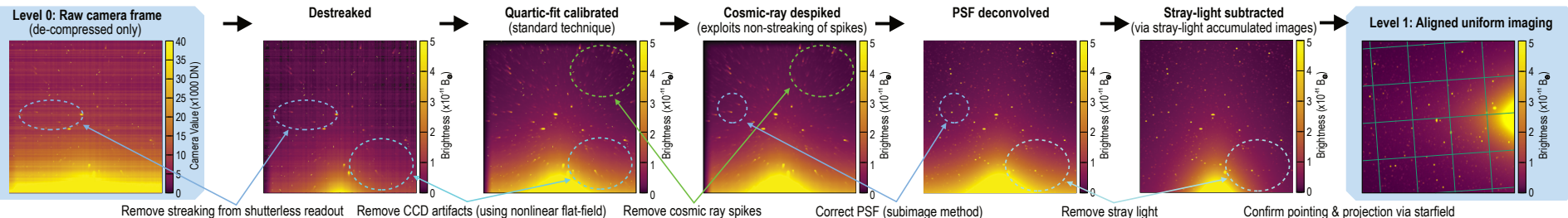


# Science Data Pipeline and Products

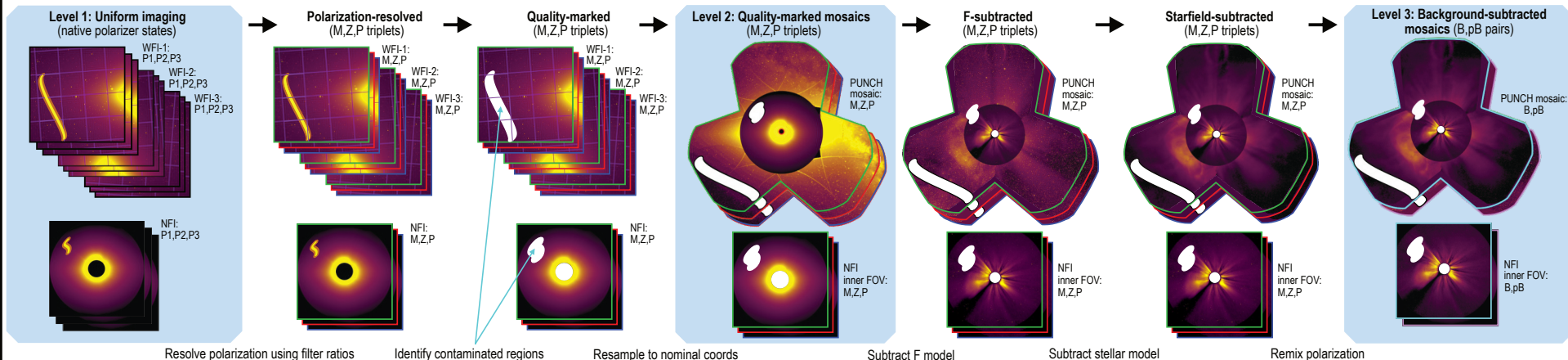
### A. Level 0 $\rightarrow$ Level 1 Pipeline

Level 1 images are photometrically calibrated, precisely aligned images with instrumental artifacts corrected. To demonstrate PUNCH data reduction, we degraded and then processed data from STEREO/HI1 to show the PUNCH L1 processing. For clarity, all visual effects are 10-40x stronger here than in actual PUNCH images. These processing steps are the same for both WFI and NFI.



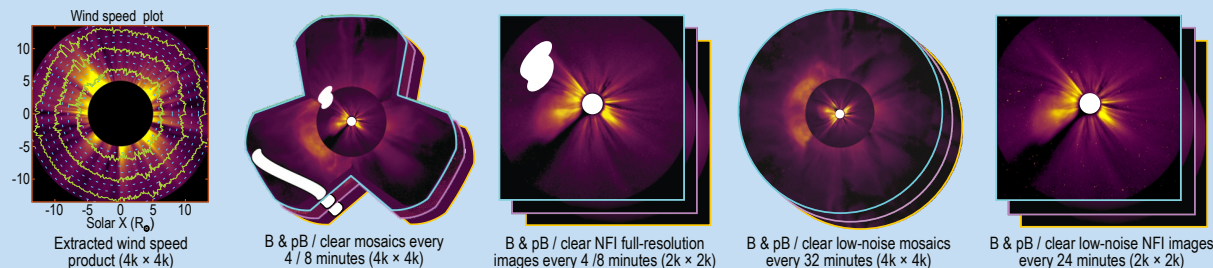
### B. Level 1 → Level 3 Pipeline

The L1 to L2 stage maps polarization to M,Z,P triplet polarizer brightnesses, then generates full PUNCH mosaics. Clear exposures (not shown) skip the (M,Z,P) step. The L2 to L3 stage removes background F corona (fixed in heliospheric coordinates) and starfield (fixed in celestial coordinates), then generates B and pB products. Nearly all frames have no contamination.



### C. Level 3 Data Products

PUNCH Data Products are polarized and clear photometric images suitable for analysis in common existing scientific environments and with PUNCH-specific tools distributed by the project. Primary science products are shown.



### Legend

## Data Product

Polarized Images:

— M ( $-60^\circ$ )

$M(-90^\circ)$

$Z(0^\circ)$

$$Z(0)$$

— P (+60°)

— B

— pB

 Clear

#### D. End-To-End Data Flow

