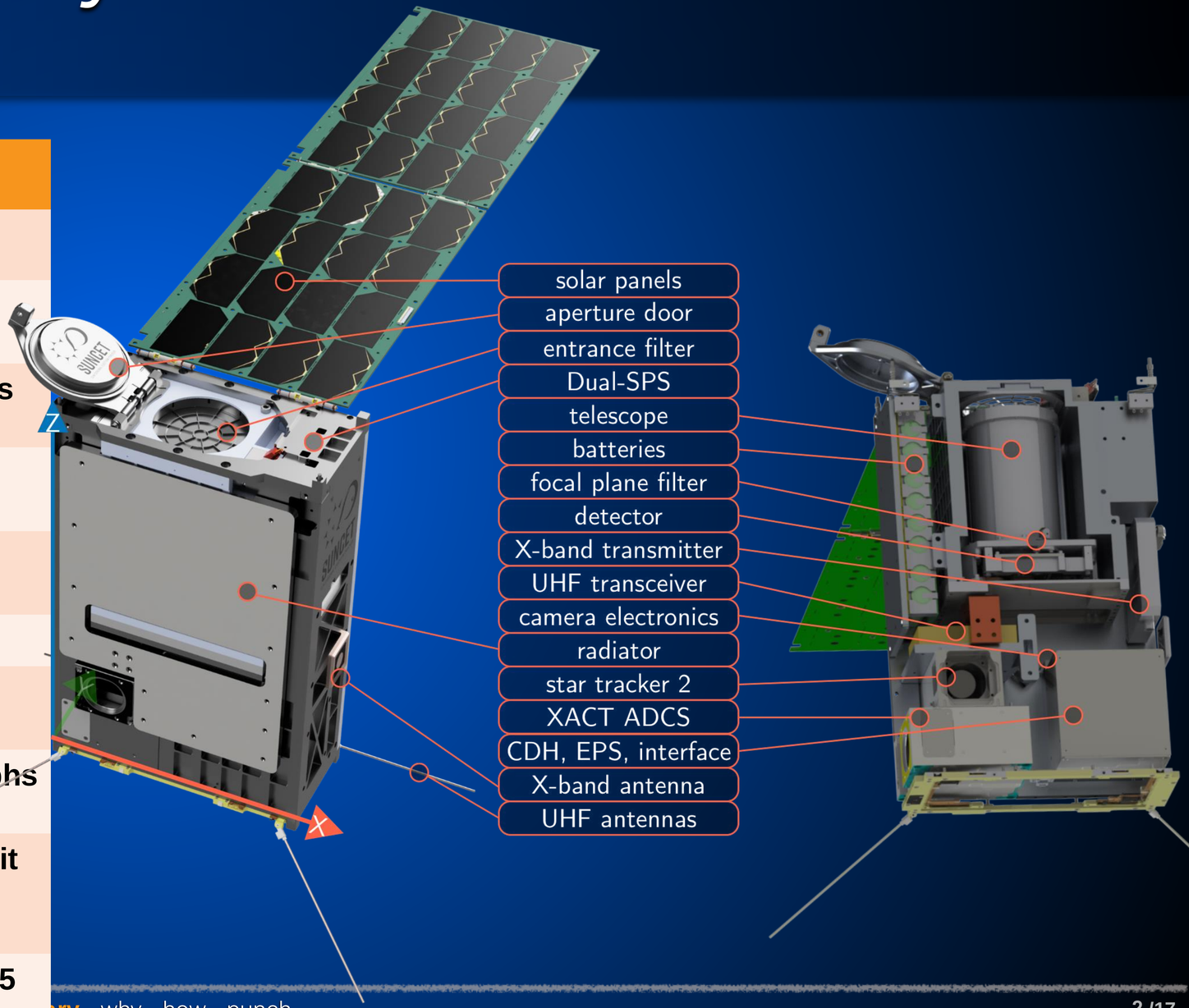
SUNCET

SUN CORONAL EJECTION TRACKER

Concise summary

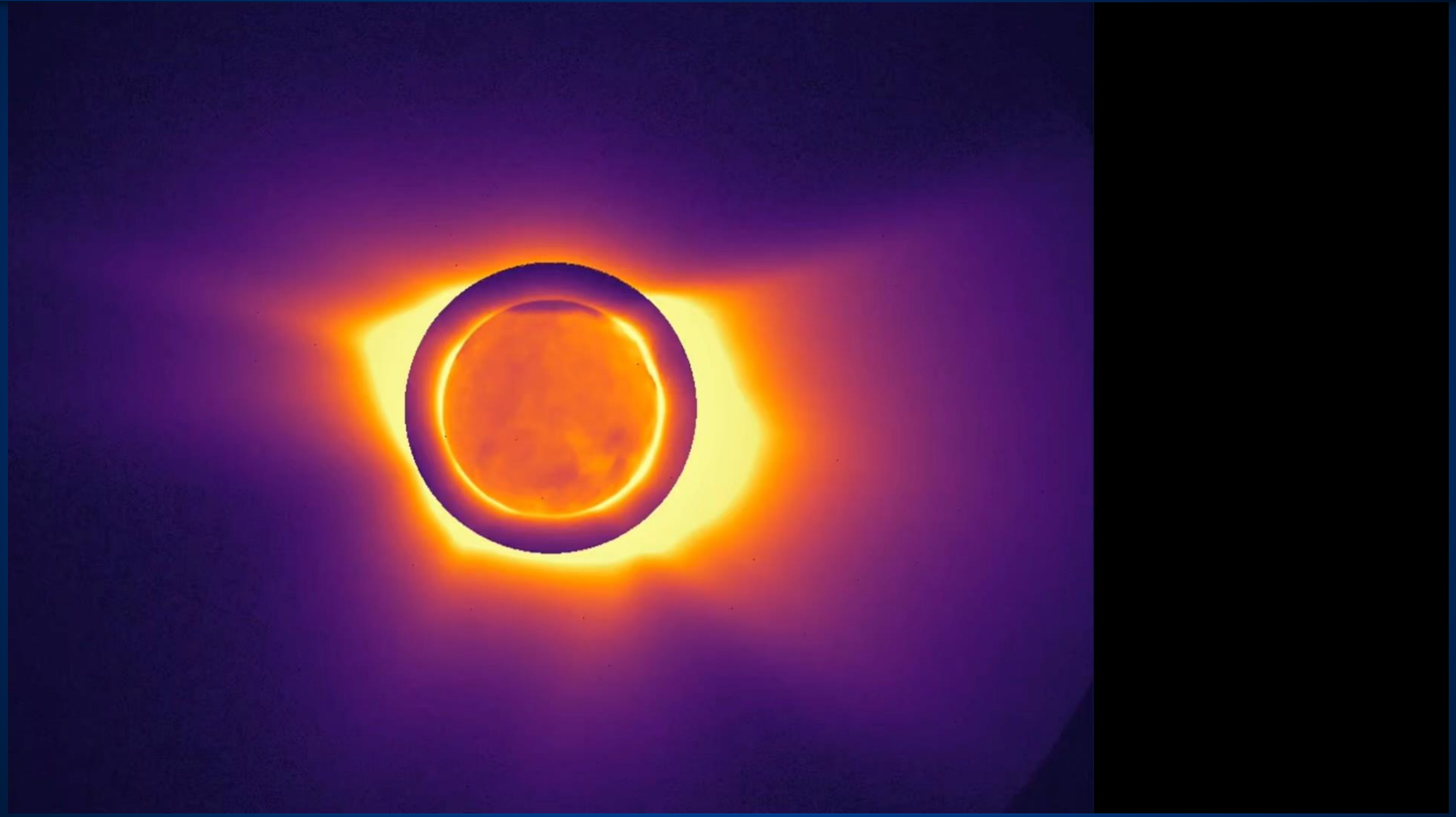
NASA mission tech specs

Parameter	Value	Note
Form factor	6U CubeSat	~Shoebox size
Launch date	Sometime 2026	Space X Falcon 9 TSIS-2 Rideshare
Prime mission	8 months	To extend as long as able
Orbit	Altitude ≤ ~550 km inclination ≥ 35°	sun-sync 98° Inclination
FOV	±5.34 $R_\odot$ x ±4 $R_\odot$	That's wide! ±1.5 is typical
Bandpass	170-200 Å	Wider than typical
Dynamic range	$2x10^6$	SDO/AIA's is 10^4 (typical)
Spatial resolution	20 arcsec	Similar to coronagraphs
Exposure times	0.035 sec (on disk) 15 seconds (off disk)	Configurable on orbit
Cadence	1 minute	Nominally; can do 15 sec



Why SunCET is needed

Bulk of CME acceleration occurs in the “middle” corona (e.g., Bein et al., 2011; D’Huys et al., 2014)



Mason+, ApJ, 924, 63 (2022)

How SunCET handles 10^4:1 disk:off-disk photons

A novel, simultaneous high dynamic range (SHDR) detector + algorithm

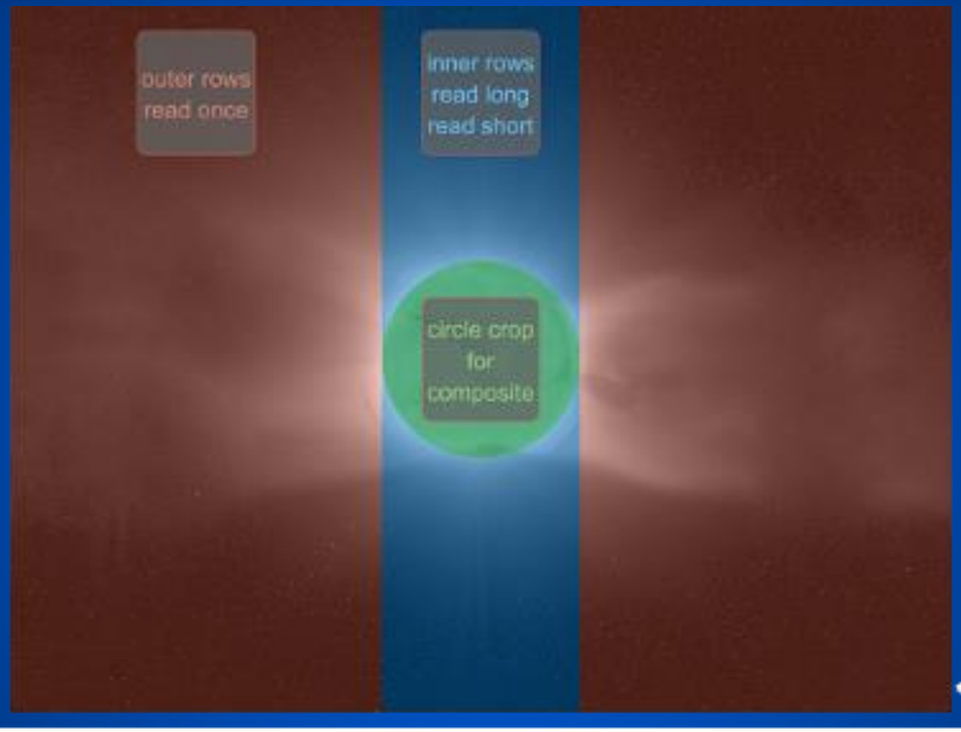
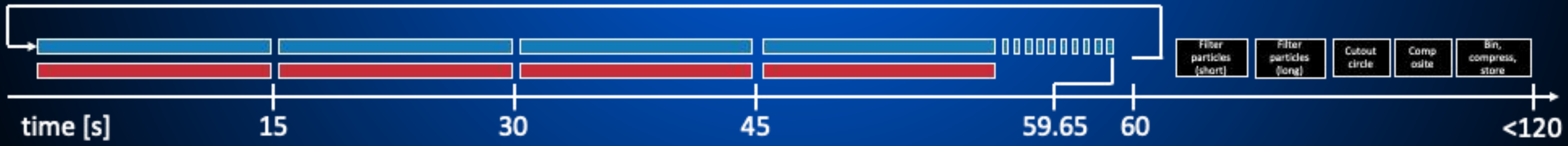


*image dimensions and colored regions to scale

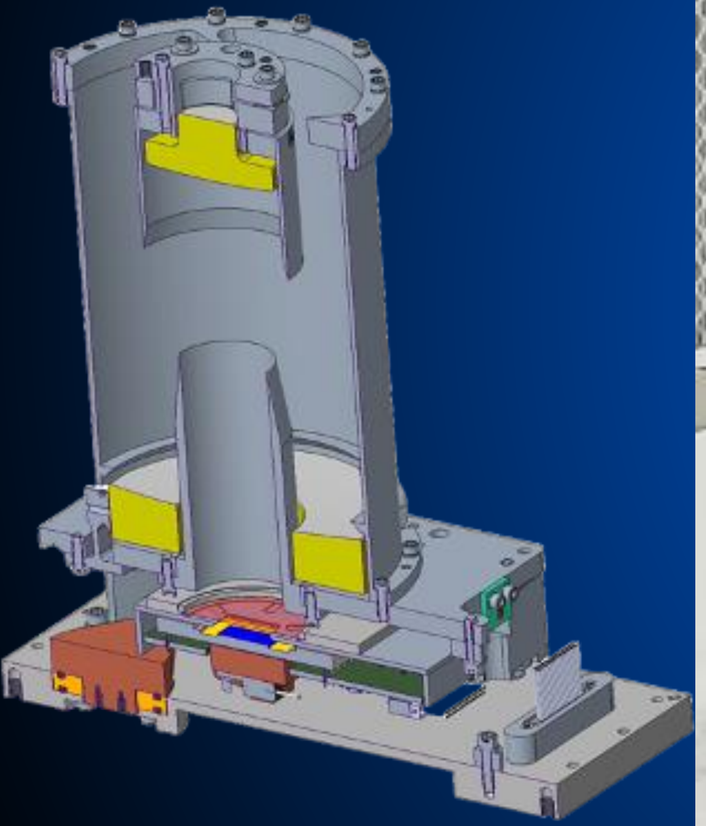


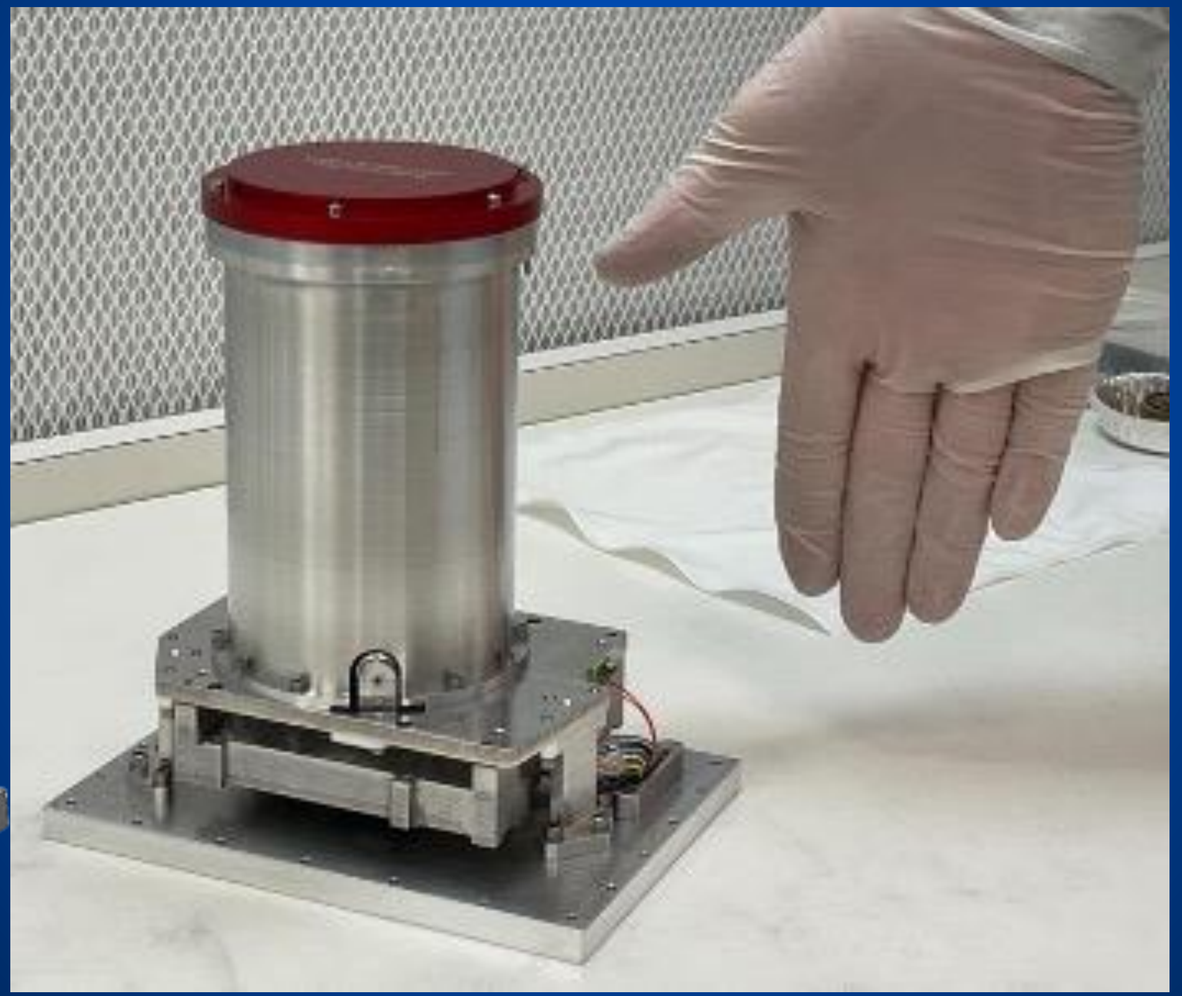
Sun image is MHD simulation run on NASA's Pleiades supercomputer of solar CME (dimmest of the set we ran = worst case),
then passed through our SunCET instrument simulator to create realistic synthetic SunCET image composites (right FOV, spatial/temporal/spectral resolution, QE, QY, reflections, etc)

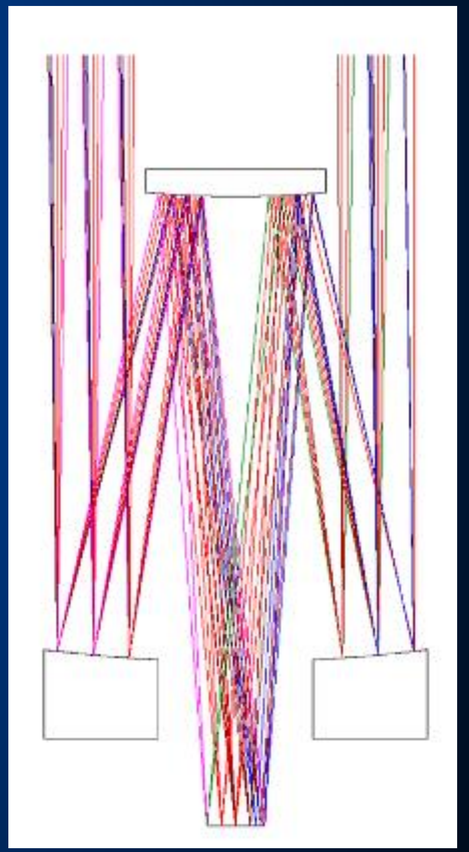
Mason+, ApJ, 924, 63 (2022)

Standard Ritchey-Chrétien Telescope

Provides wide field of view, and can be made *tiny*



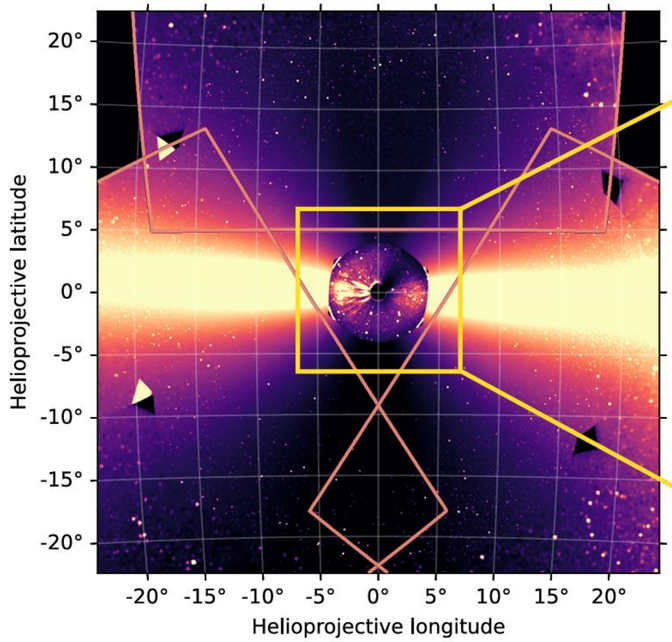




SunCET-PUNCH Overlap

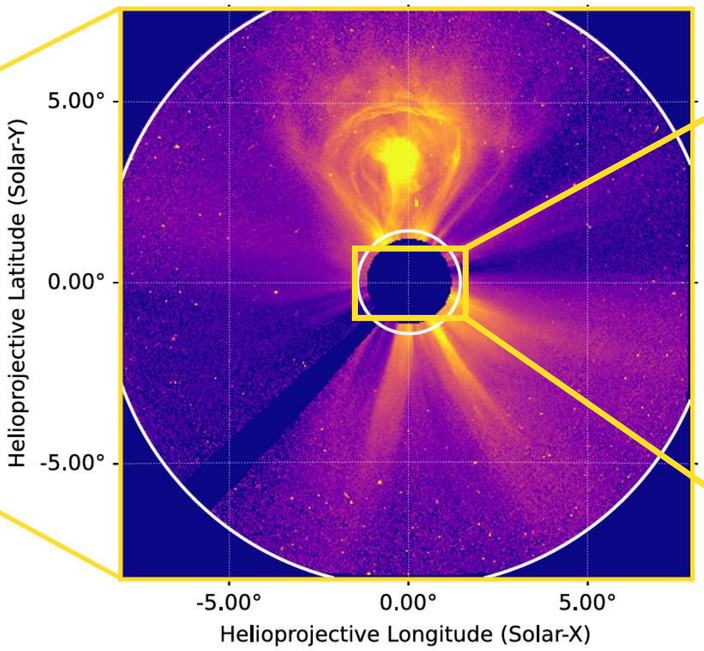
Fields of view

WFI



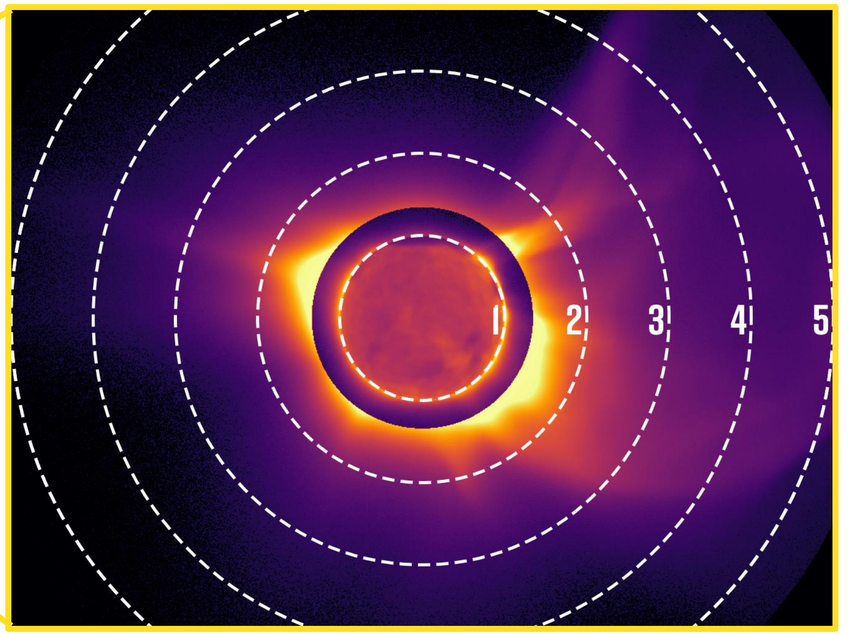
17.4 $R_\odot$ – 180 $R_\odot$

NFI



5.4 – 32 $R_\odot$

SunCET



±5.34 $R_\odot$ × ±4 $R_\odot$