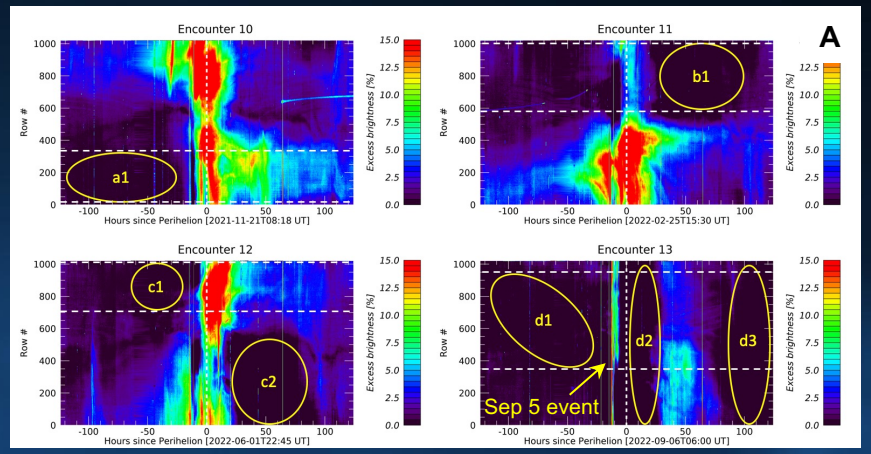
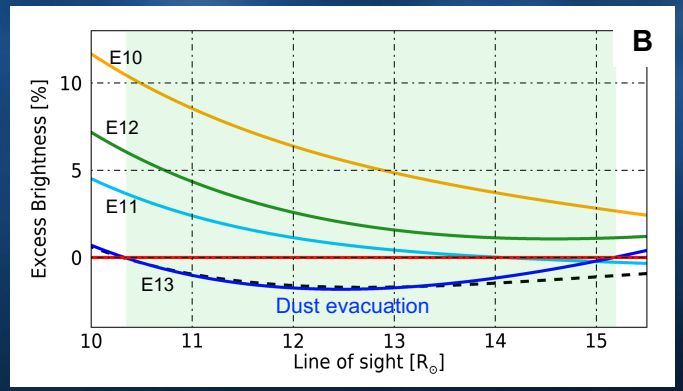
JOHNS HOPKINS
APPLIED PHYSICS LABORATORY

Investigating Coronal Holes and CMEs as Sources of Brightness Depletion in WISPR Images



Time evolution of the median brightness of each WISPR-I image row for PSP E10 thru E13. The circles mark the brightness depletion regions. The horizontal, white dashed lines indicate the latitudinal bands used to compute the proxy, P_{ch}



Percentage excess brightness of the modeled baseline brightness levels of each encounter with respect to the modeled F-corona baseline level (in red)

We developed a methodology to identify the sources of brightness variations –specifically, brightness depletions, in WISPR images.

- Brightness depletions (Figure A, yellow circles) in white light imagers might be due to 1) coronal holes (CH), or 2) electron or dust evacuation by large CME events.
- A novel proxy, P_{ch}, backed by the unique location of PSP (short lines of sight), allows to identify small equatorial CH effects (difficult from 1au) and explains the majority of observed depletions.
- The Sep 5 2022 CME depleted both electrons and dust (Figure B). This is a first. Dust evacuation has been postulated but never observed before. This is also the first study of the coronal environment in the wake of an event.

Stenborg et al. (2023) ApJ 949, id.61, doi: 10.3847/1538-4357/acd2cf