## Looking to the photosphere to help constrain the evolution of heliospheric oscillations

Sam Van Kooten Steve Cranmer University of Colorado, Boulder

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## How do oscillations & turbulence evolve from here to here and beyond?

Image: SWAP/PROBA2, Seaton+2013 (left), Druckmüller, Aniol, Habbal (right), Cranmer+Winebarger 2019 (composite)

- We have been preparing to measure small-scale, photospheric wave driving in DKIST observations
- Photospheric bright points are flux tube foot points
- We track bright point shape changes and interpret as driving of multiple thin-tube wave modes
- Working now with MURaM sims (courtesy M. Rempel)

DKIST first light (NSO/AURA/NSF)



- Our spectra compared to oscillation spectra elsewhere
- If spectra are comparable, suggests steepening (turbulent processing?) occurs ~everywhere?
- PUNCH aims to understand evolution of fluctuations throughout heliosphere (esp. WG 1B), will add complementary data

