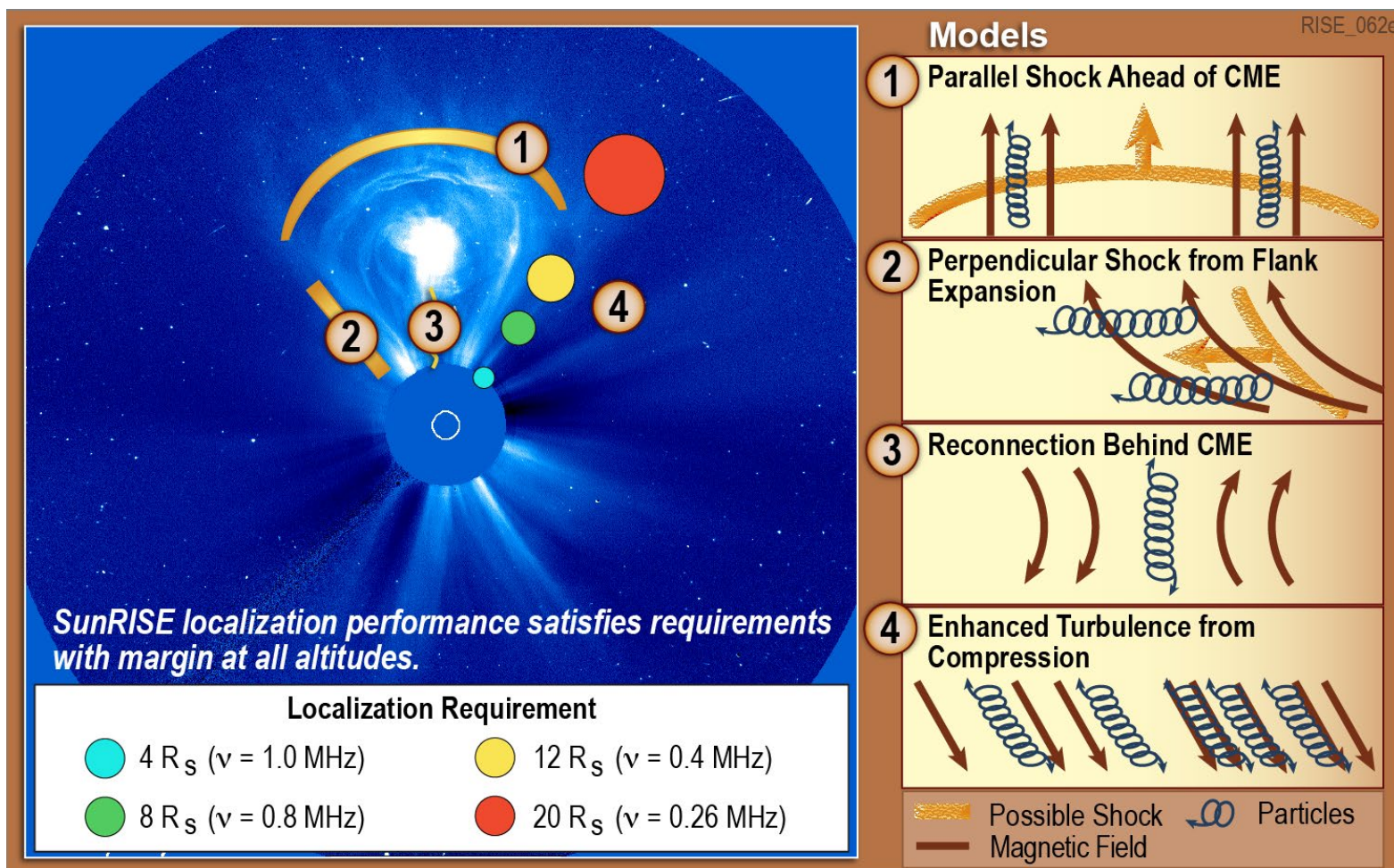
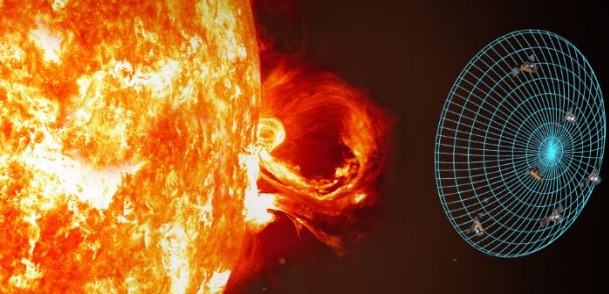


# Categories of Theories of Ion and Electron SEP Acceleration by CMEs



Sun Radio Interferometer  
Space Experiment





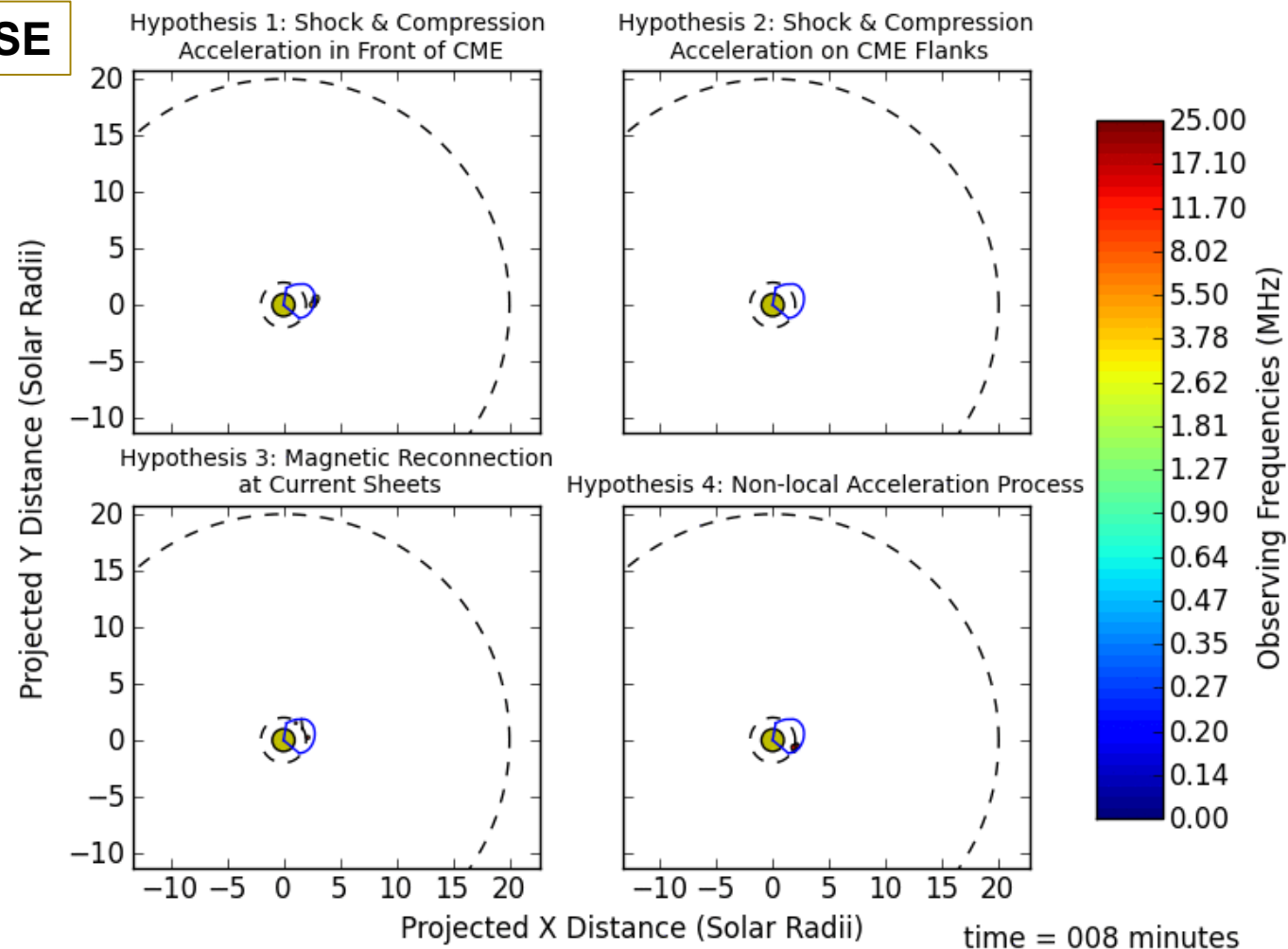
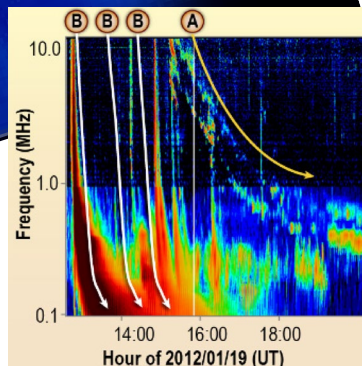
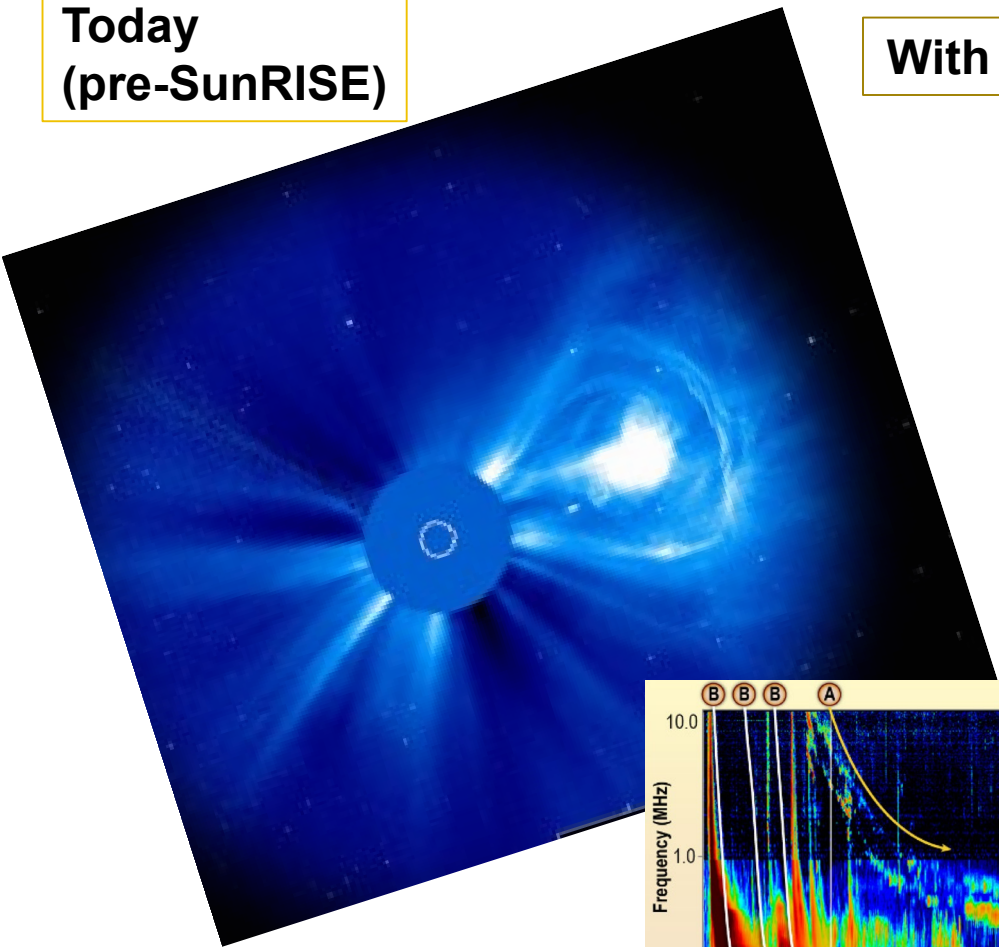
# First Identification of Solar Radio Burst and Solar Energetic Particle (SEP) Source Location



Sun Radio Interferometer  
Space Experiment

Today  
(pre-SunRISE)

With SunRISE







# Categories of Theories of Ion and Electron SEP Acceleration by CMEs

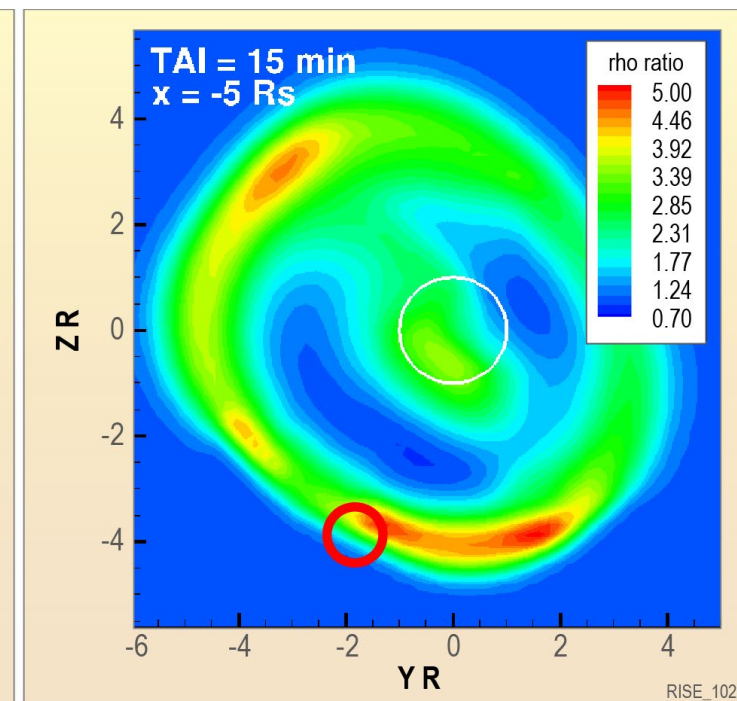
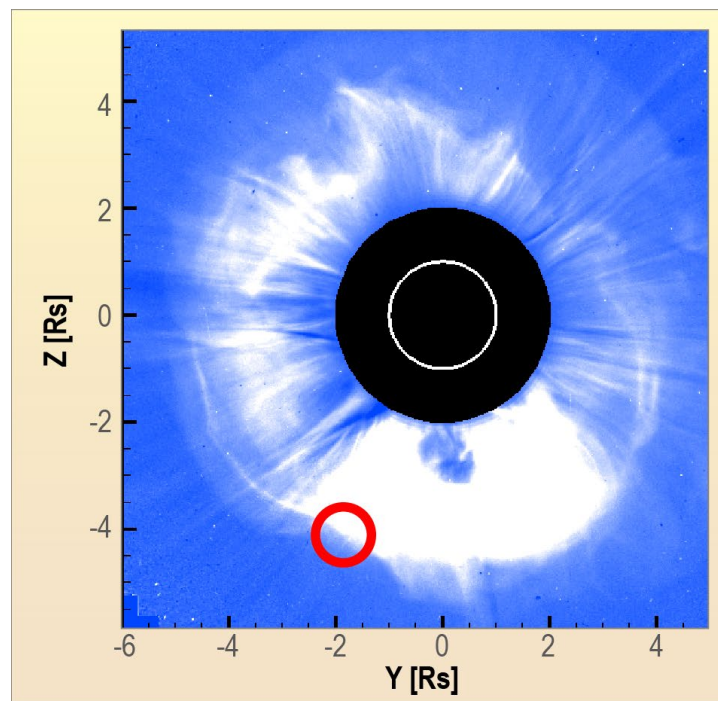


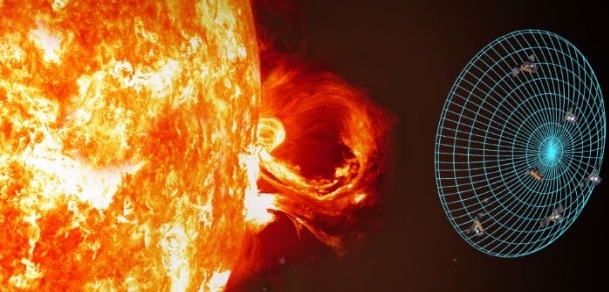
Sun Radio Interferometer  
Space Experiment

**O1.1:** Is shock/compression, magnetic reconnection, or non-local acceleration the source of initial electron acceleration and associated Type II radio bursts?

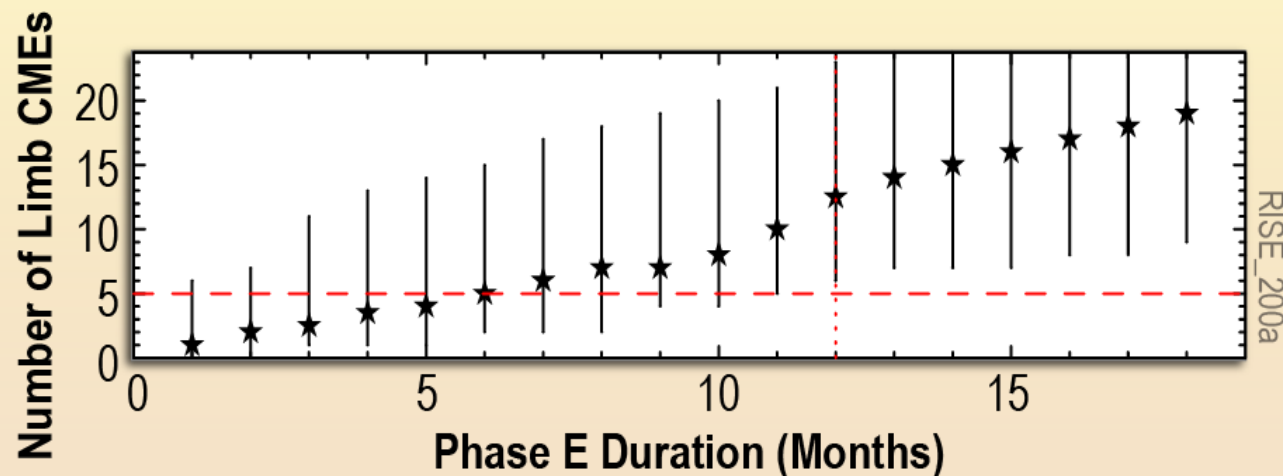
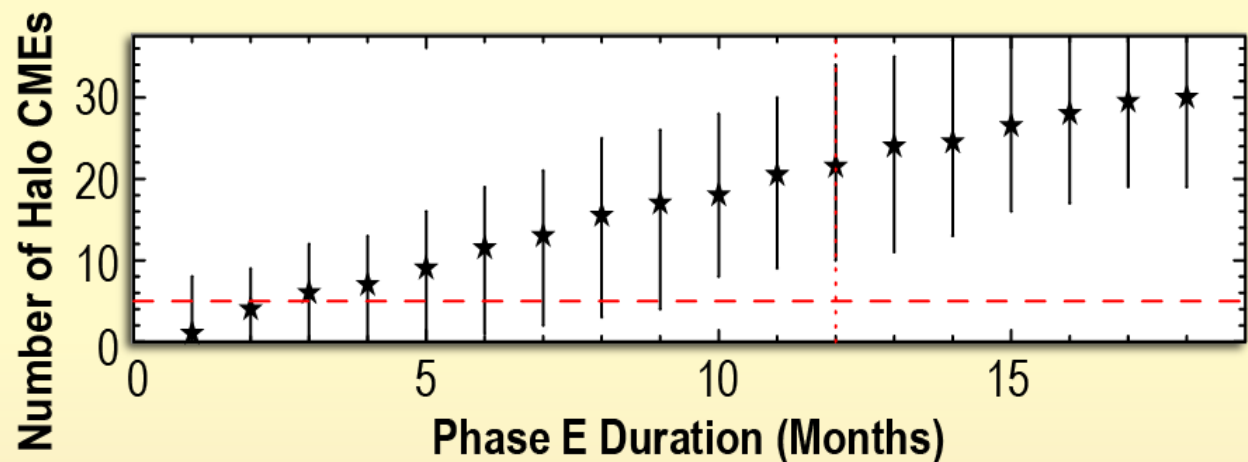
**O1.2:** What physical properties of CMEs and the upstream corona are correlated with Type II bursts?

**O1.3:** Are CMEs with Type II bursts but no SEPs due to the burst locations not being connected to the interplanetary observer?

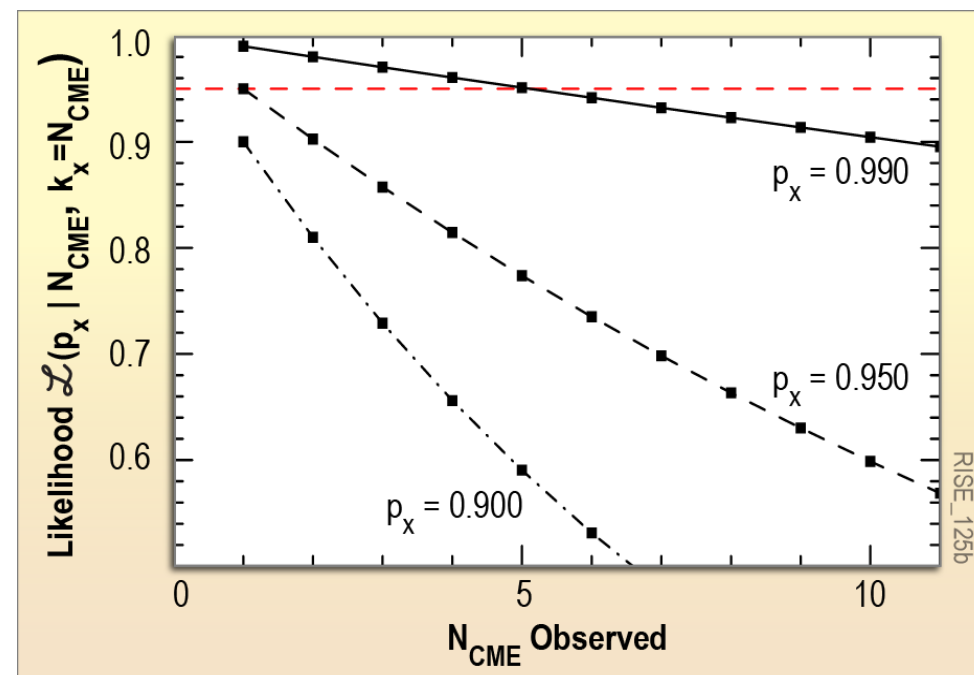




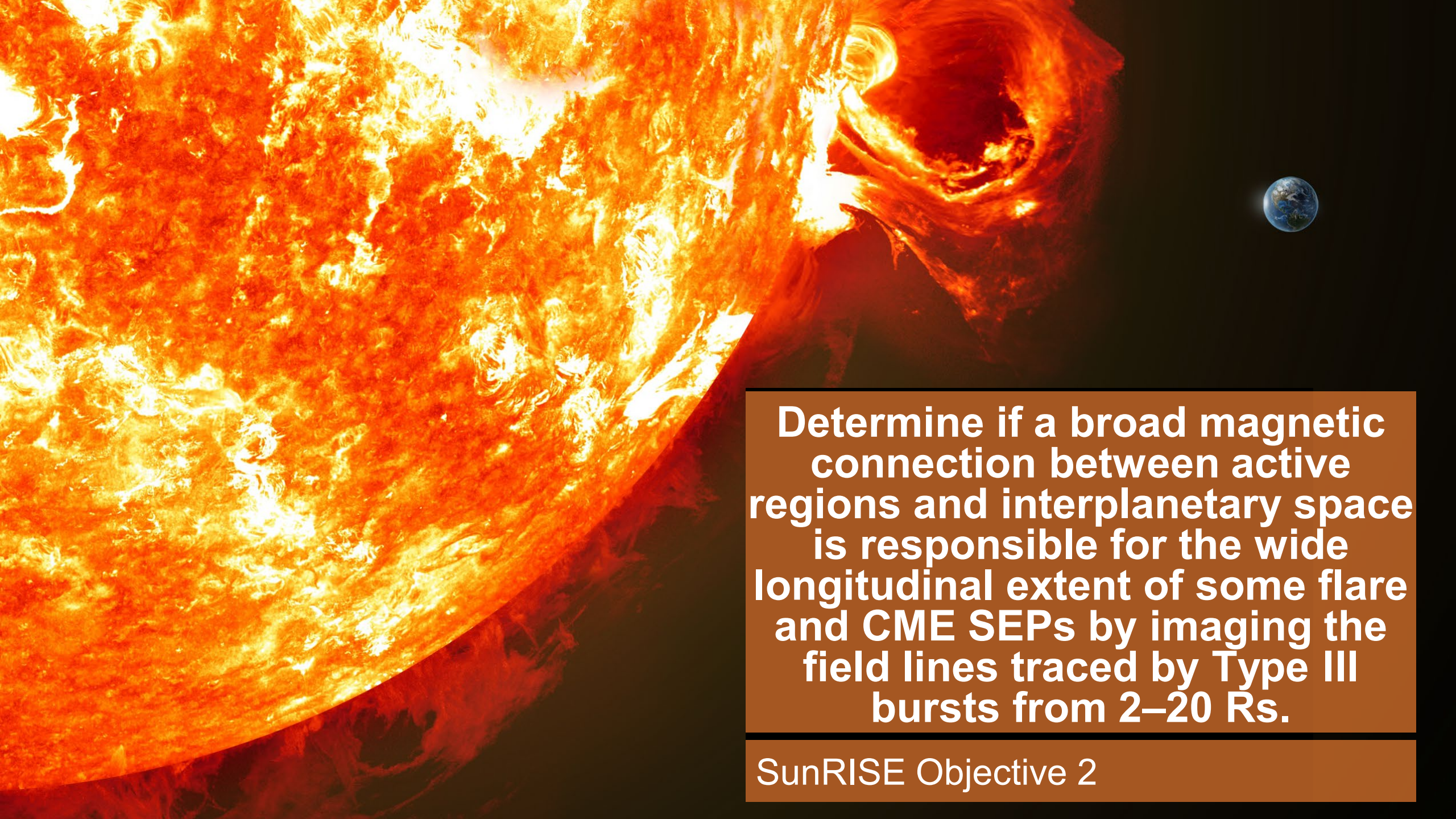
# Value of the Extended Shifted Phase E



There are so many events we can identify the primary emission location in presence of confusion or a secondary location



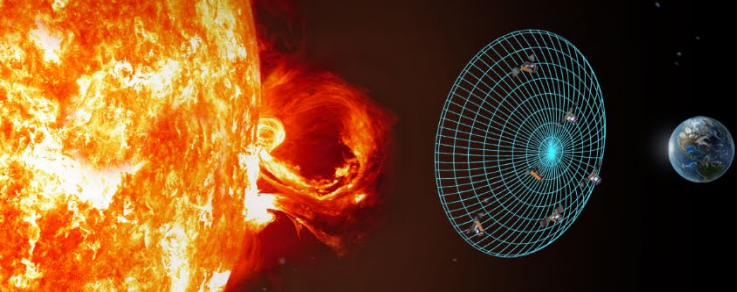




**Determine if a broad magnetic connection between active regions and interplanetary space is responsible for the wide longitudinal extent of some flare and CME SEPs by imaging the field lines traced by Type III bursts from 2–20 Rs.**

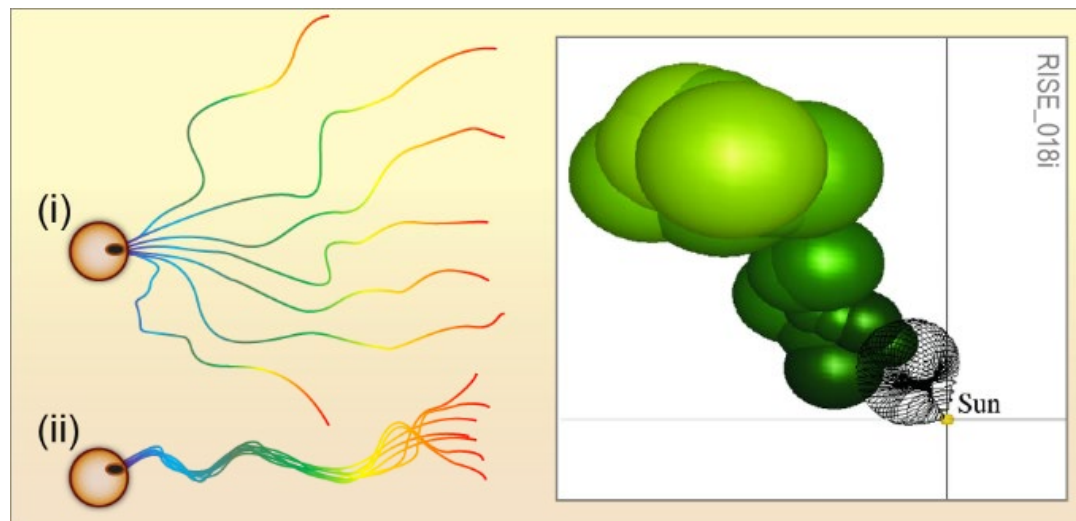
**SunRISE Objective 2**





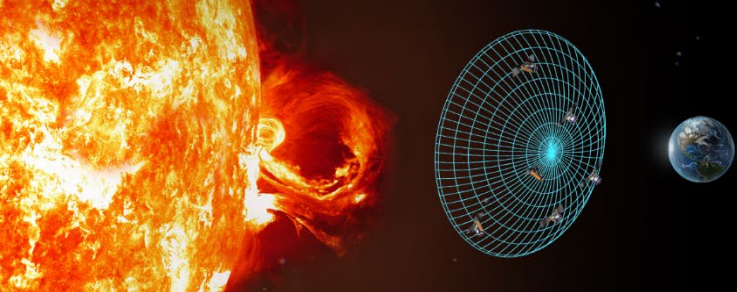
# Mapping field lines

**O2.1:** What is the spatial and temporal variation of the magnetic connection between an active region and the heliosphere in space and time?



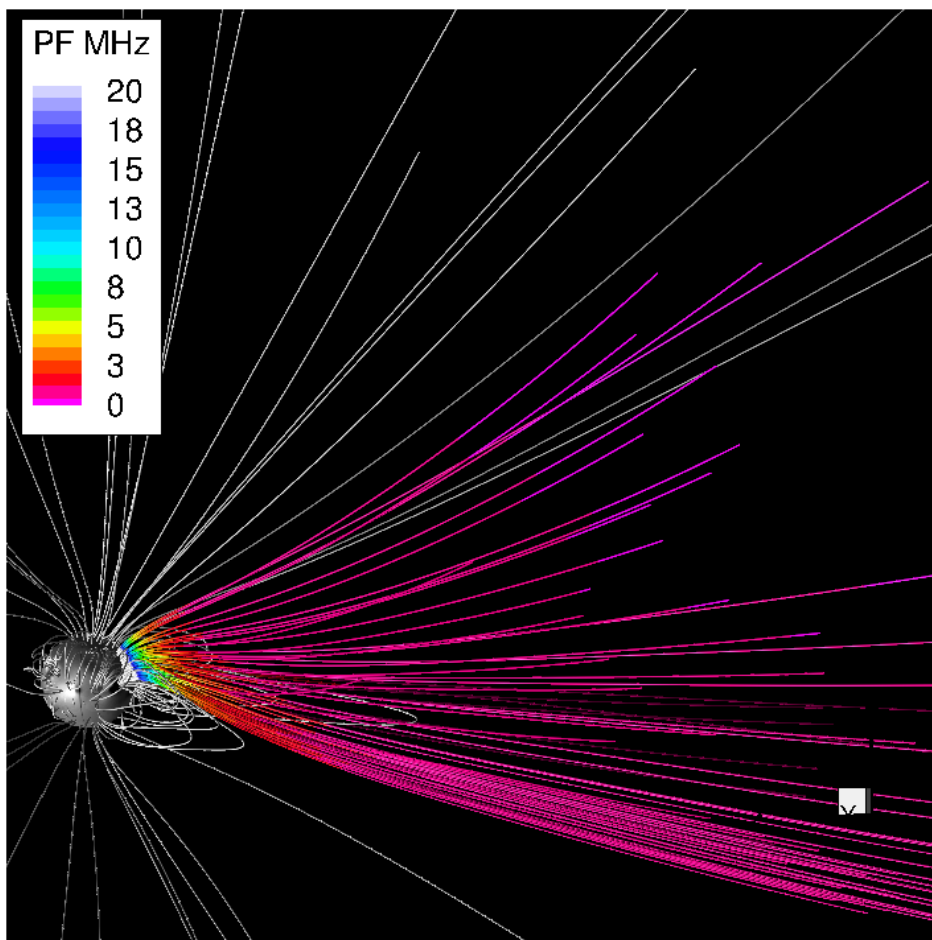
**O2.2:** How well is the observed magnetic topology reproduced by coronal simulations?



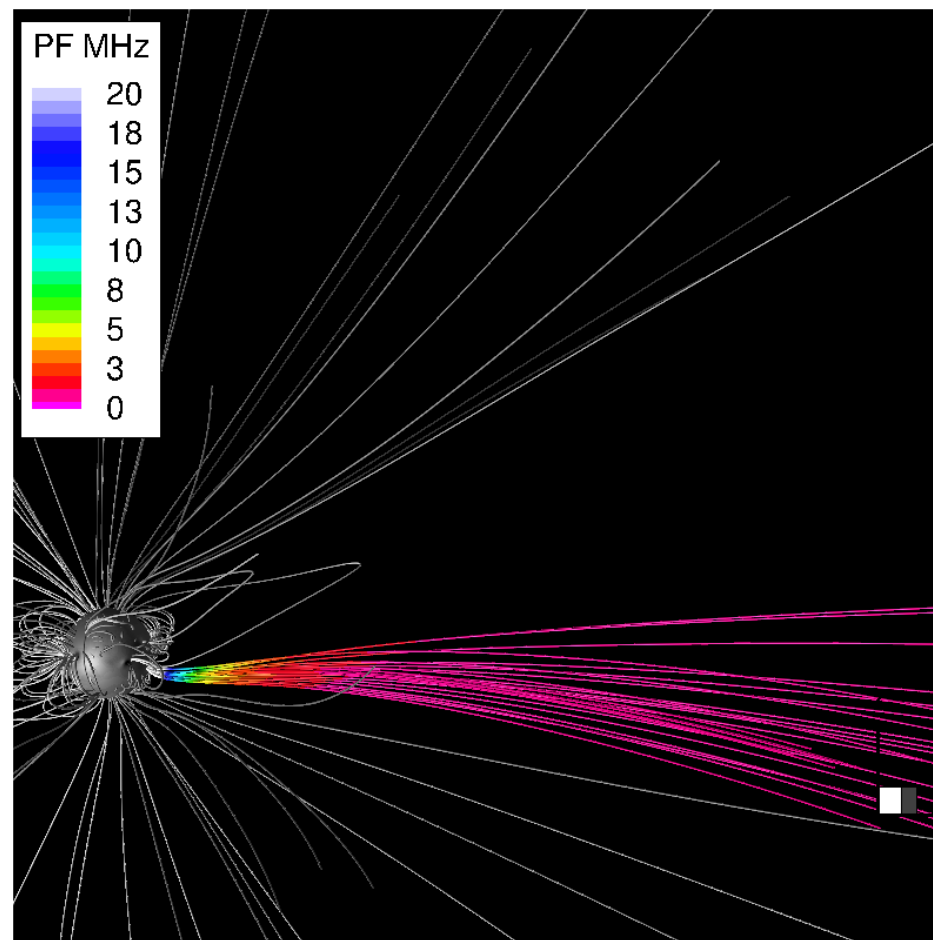


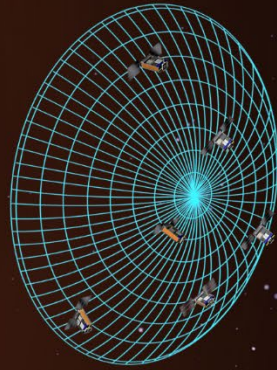
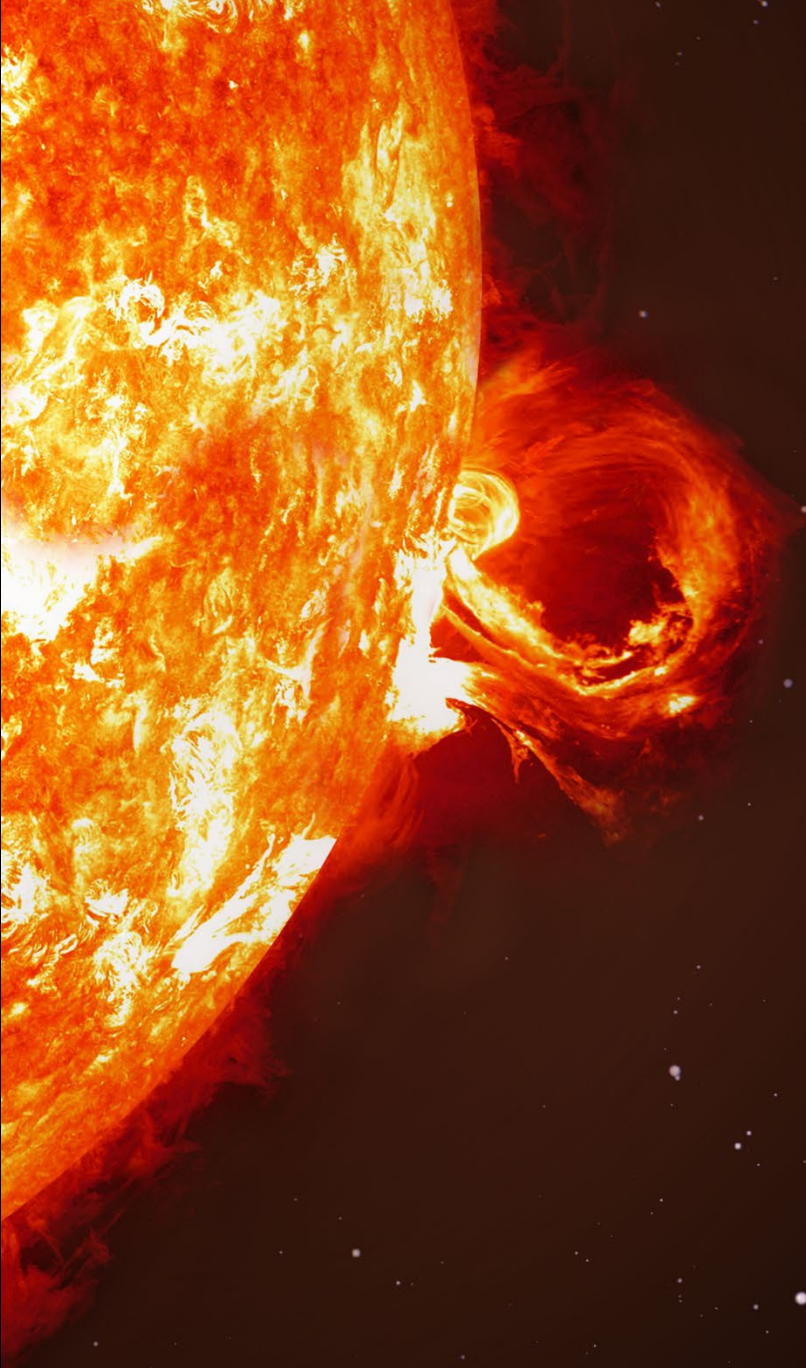
# First Maps of Magnetic Connection

**Broad Connection Scenario**



**Tight Magnetic Bundle Scenario**





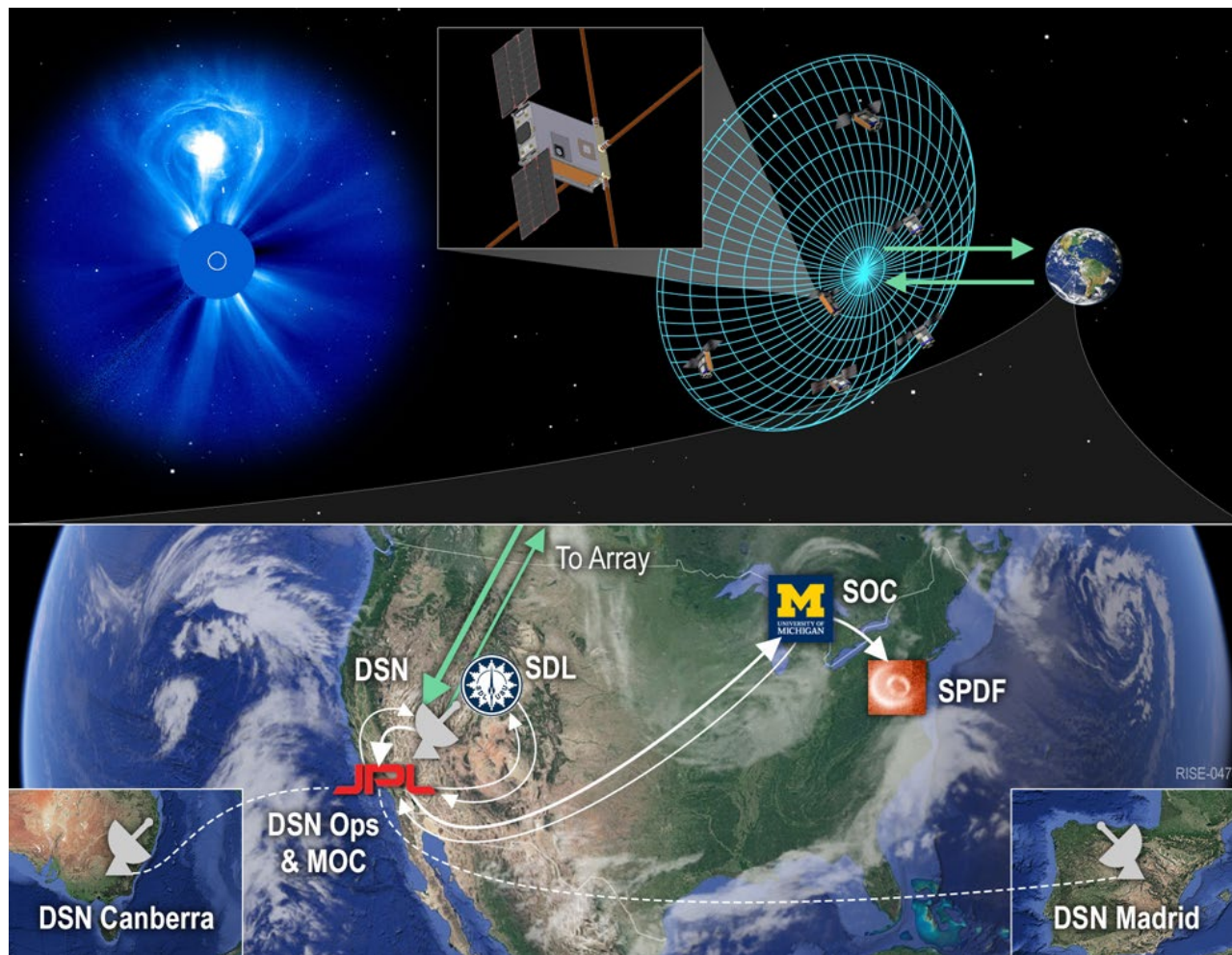
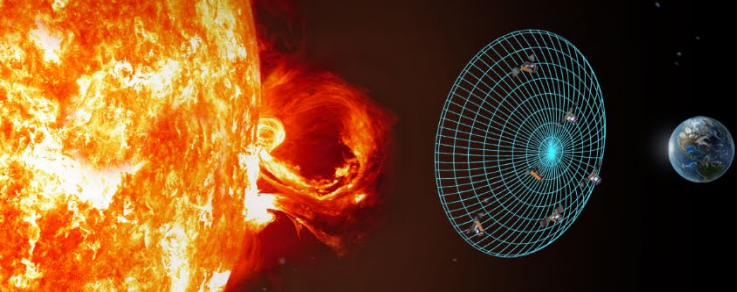
# Implementation



Sun Radio Interferometer  
Space Experiment

PRINCIPAL INVESTIGATOR: Justin C. Kasper (University of Michigan)

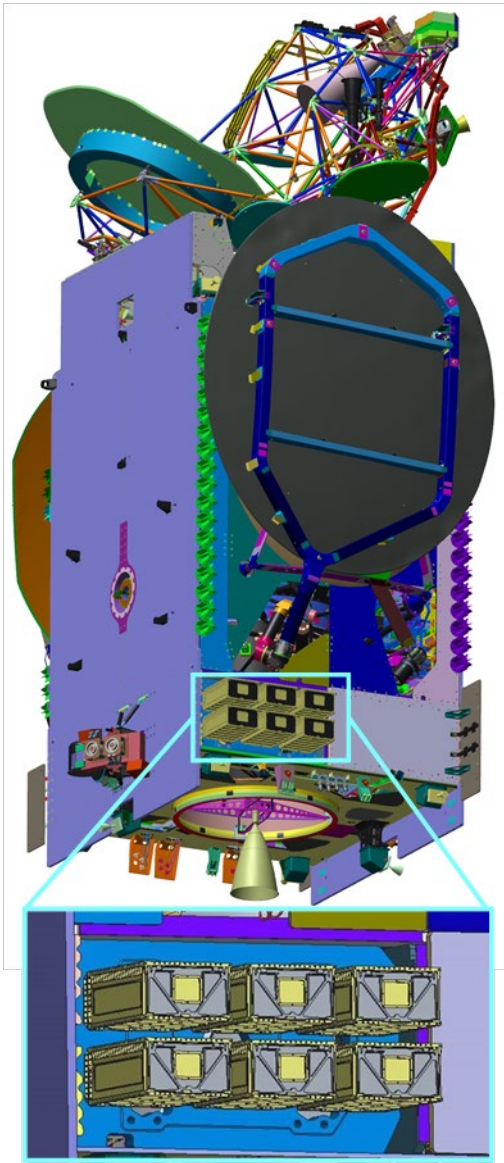




## IMPLEMENTATION

- First interferometer in space, first decametric-hectometric (DH) imaging
- Loose formation of six 6U form factor CubeSats in 10 km sphere
- GEO Plus Orbit (25 hour orbit period)
- DH radio receiver (0.1 – 20 MHz) with crossed 3m dipole antennas
- Data collection in series of  $500\mu s$  bursts every 0.1s, select from 4096 frequencies
- Relative position knowledge to within 3 m and timing to ns
- Direct delivery to GEO+ as secondary payload
- 3GB of data produced per week, all downloaded no bursts or triggers
- March 2022 Launch Readiness, 12 month Phase E





SSL Payload Orbital Delivery System (PODS)

