

H3 D: Stellar Cycles

Targeted Outcome: Spiral Phase 3: 2025-2035, Understanding the Nature of our Home in Space
Stellar Cycles

Required Understanding

Develop and test a predictive dynamo model for the Sun and Sun-like stars

Stellar cycles of various types of stars with different physical conditions will reveal the fundamental functional dependence of the dynamo on the relevant physical parameters.

Nonlinear dissipative system of solar magnetic dynamo and predictability of cycles

Influence of solar cycle on Earth atmosphere, climate changes, weather, and catastrophes.

Enabling Capabilities & Measurements

Observing the patterns in surface magnetic fields throughout activity cycles on a large sample of Sun-like stars

Mapping of the stellar magnetic field and differential rotation using interferometric UV images that resolve starspots

Multi-spacecraft missions with precision formation flying

Space-based optical interferometry

Implementation Phase 3: 2025-2035

Stellar Imager

With interferometric UV imaging, sampling many sun-like stars that exhibit stellar cycles

Theory/Modeling Program

To model stellar cycles with dynamo-driven flows in stellar interiors and surfaces and associated UV and optical emission