HS Working Group 1

Reconcile flow results from different local and global helioseismic techniques

Rudi Komm, Junwei Zhao, Jason Jackiewicz, Kiran Jain, Sylvain Korzennik, Johann Reiter, Ed Rhodes, Sushant Tripathy

- Derive big-ring flow maps from GONG and compare with HMI flow maps.
- Compare time-distance with ring-diagram HMI synoptic flow maps and HMI and GONG ring-diagram flow maps and establish similarities and differences. Progress is expected within the first year.
- Revisit Center-to-Limb correction for HMI and GONG ring-diagram flows.
- Measure and compare local and global flow maps throughout NSSL.
- (Builds on HS-WG1 of Phase I)
- Complementary to SL-WG2.
- **NSSL** Theme

HS Working Group 2

Rotation & structure using global helioseismology

Charles Baldner, Sylvain Korzennik, Sarbani Basu, Alexander Kosovichev, Johann Reiter, Ed Rhodes

- Testing how random noise limits detecting the tachocline properties (position, thickness and variation with latitude).
- Tease out the signature of tachocline position and thickness variations.
- Rotation and structure closer to the surface ($r>0.99R_\odot$) with $\ell>300$.
- (Builds on HS-WG2 & HS-WG3 of Phase I)
- **Tachocline** and **NSSL** Theme

HS Working Group 3

Center-to-Limb effect & other systematics

Ruizhu Chen, Junwei Zhao, Shukur Kholikov, S.P. Rajaguru, Matthias Waidele

- Understand the systematics (Center-to-Limb, CtoL) as well as HMI-specific ones in time-distance helioseismic measurements of the deep interior — both for meridional circulation and rotation and their temporal variations. Progress is expected in this sub-milestone within the first year. Key diagnostics involve frequency dependence of CtoL, and surface magnetic field related flows and systematics. Findings here will also contribute to understanding the dynamics of the NSSL.
- Use time-distance helioseismology to measure the rotation axis alignment down to the tachocline — this will involve constraining the Carrington Elements that determine the solar rotation axis and hence measuring the influence of variations in solar P and B0 angles.
- (Builds on HS-WG4 of Phase I)
- **Tachocline**, **FT&E**, and **NSSL** Theme

HS Working Group 4

Helioseismology technique validation with models

Jason Jackiewicz, Doug Braun, Shea Hess Webber, Alexander Kosovichev, Matthias Rempel, Andrey Stejko

- Validate local helioseismic techniques with large-box models and model flows to derive near-surface flows and flows under active regions.
- (New in Phase II)
- **FT&E** and **NSSL** Theme

HS Working Group 5

Extend the HMI Time Distance pipeline flows to deeper layers

Junwei Zhao, Ruizhu Chen, Tom Duvall, Jason Jackiewicz, Shukur Kholikov, S.P. Rajaguru, Matthias Waidele

- Extend the HMI Time-Distance pipeline to produce flows in layers as deep as about 50 Mm.
- Develop new codes for TD measurements, including Center-to-Limb removal and inversions.
- Complementary to HS-WG1 and HS-WG3.
- (New in Phase II)
- **FT&E** and **NSSL Theme**

HS Working Group 6

Rossby waves

Mausumi Dikpati, Matthias Waidele, Tom Duvall, Alexander Kosovichev, Junwei Zhao

- Cross-team WG with Dynamo and Helioseismology Team members.
- (New in Phase II)
- **Tachocline** and **NSSL Theme**

HS Working Group 7

Subsurface Flows near long-lived activity complexes

Junwei Zhao, Rudi Komm, Alexander Kosovichev

- Flows associated with activity nests and active longitudes and supergranules.
- (New in Phase II)
- **FT&E** Theme

HS Working Groups & Themes

	Tachocline	FT&E	NSSL
HS-WG1			X
HS-WG2	X		X
HS-WG3	X	X	X
HS-WG4		X	X
HS-WG5		X	X
HS-WG6	X		X
HS-WG7		X	