

Plan-B: Summary and discussions

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Key items to be addressed in the meeting

- ***Which problems are solved or unsolved with Hinode and SDO?***

- Physics at the photospheric layer

Ongoing with Hinode, not primary objectives for Solar-C

- Convection, photospheric magnetic field dynamics, local dynamo
- Sunspot structure, penumbra, magneto convection
- Flux emergence, flux cancellation

- **Unsolved areas are still in the chromosphere and corona**

- Dynamics and heatings in the chromosphere and corona
- Structures and dynamics (spatially, temporally, and thermally) unresolved exist.
- Their understanding is essential to understanding physical processes involved in various kinds of phenomena.

Plan B overall direction

- **Large jumps from Hinode scientifically and large discovery spaces?**
 - **Spectro-polarimetric (SP) observations**
 - B measurements at the chromosphere and corona
 - Chromospheric B is completely different from photospheric B.
 - Chromosphere provides a large discovery space
 - **Temporal cadence in spectroscopic obs**
 - Dynamical chromosphere. Some instrumentation ideas, such as multi-slit scanning.
 - High throughputs in EUV
 - **Simultaneous, co-spatial observations with multiple numbers of spectral lines (SP, EUV/X)**
 - Covering wide range of temperature structures from photosphere to the corona
 - **Spatial resolution**
 - Sub-arcsec resolution in coronal observations

What is scientific key requirements for large discovery spaces?

- Magnetic field measurements
 - Call IR triplet and HeI 10830 are most suitable for chromosphere?
 - 0.4-0.5 arcsec resolution with 50cm aperture, S/N 10^4 is achievable for a few second integration
 - UV much better diagnostics for chrom.-TR dynamics
 - Coronagraph polarimeter for corona, coronal field modeling and FOV
- EUV spectrograph
 - Throughput $\times 10 \sim \times 100$ of EIS
 - 0.X(5?) arcsec, wide temperature coverage
- X-ray Imaging telescope
 - 0.5 arcsec
 - Much enhanced to high temperature region
- Observations only are not enough.
 - 3D radiation MHD, coronal field modeling ...

What will be new worlds, if the scientific requirements can be realized? Technical reality.

Why space? (for chromosphere)

- Long integrations for spectro-polarimetry: seeing free condition is needed to achieve high resolution
- Spectroscopy: Image restorations difficult
- Limb observations: scattering in the atmosphere, difficult with adaptive optics

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Need to compare with ground-based observations including ATST.

Enough attractive?

- **Sciences of plan B are very attractive to non-solar-physicists?**
- Solar physicists want to **understand fundamental physical processes** taking place in various kinds of dynamics and heatings
 - They are all fundamental physical processes common to dynamics and heatings in astrophysics.
 - Scale coupling (Dr. Title)
 - How fast can magnetic field dissipate? This is fundamental process in astrophysics. (Dr. Isobe)
 - Thermal non-equilibrium, Ion/electron temperatures (Dr. Tsuneta)