

DKIST Critical Science Plan Workshop #3:

Structure and Dynamic Evolution of Photospheric Magnetic Fields

Introduction to the Critical Science Plan;
and Life cycle of a Science Use Case

DKIST Critical Science Plan (CSP)

1. Aim: By science first light, to be ready, *as a community*, to execute a set of observations exploiting the DKIST capabilities to address critical, compelling science.

Planned: two years (2020, 2021)

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DKIST Critical Science Plan (CSP)

2. How: Bottom-up approach, community based. Workshops one of the tools; NOT exclusive

<http://dkist.nso.edu/CSP>

Critical Science Plan Structure:

- Research Areas
- Research Topics
- Science Use Cases

Untitled — Edited

dkist.nso.edu/CSP

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The DKIST Critical Science Plan (CSP) is being formulated (these pages). It will define critical science goals for the first or two years of DKIST operations, and in the process help refine data handling procedures and science operations. The aim is to be ready by start of operations to execute a set of observations that take advantage of the DKIST capabilities to address critical compelling science. The Critical Science Plan will be built up from a set of PI led Science Use Cases (team or individual efforts). These will be converted into Observing Proposals for consideration by the DKIST Time Allocation Committee (TAC) before first light.

Most CSP observations will be conducted in *Service Mode*, though *Access Mode* will also available to support specific needs. Along with standalone DKIST projects, coordinated observations with other observing facilities or platforms are encouraged and will be supported to meet the science goals.

As scientific goals are expected to evolve between now and DKIST first light, we anticipate that the development of the CSP will be an iterative process subjected to adjustment and revision. The development steps currently envisioned:

1. Submission of Science Use Cases (**Science Use Case Preparation**) by a broad range of community members, to include:
 - a. a statement of the scientific goals
 - b. a definition of the required instrument suite to be employed
 - c. an assessment of the multi-instrument configuration compatibility
 - d. a description of the basic data needs (image or spectra, wavelengths, cadences, and photometric, spectroscopic and polarimetric precisions)
 - e. a summary of the observing strategy and any joint facility coordination needs

DKIST Critical Science Plan (CSP)

2. How: Compile an extensive set of well defined, complementary **Science Use Cases**, detailing the topics to be investigated, the reasons why DKIST is necessary, and the type of DKIST observations necessary to address the science.

1. Formulate science context and goals; specify *why* DKIST
2. Identify observational needs (spectral lines of interest, pattern, cadence, sensitivities)
3. Determine useful DKIST instrument suite
4. Assess instrument performance capabilities

DKIST Critical Science Plan (CSP)

3. How to optimize the process:

Role of the DKIST Science Working Group (DKIST SWG)

- SWG will try to articulate the community vision of essential DKIST science through the Critical Science Plan
- The SWG will identify Science Use Case overlap and suggest team consolidation
- The SWG will assess whether the science proposed in the Science Use Cases requires DKIST capabilities
- The SWG will aim to minimize, NOT adjudicate, conflicts

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- The SWG will aim to minimize, NOT adjudicate, conflicts
- **DKIST Time Allocation Committee is final arbitrator, and will determine the order by which the Observing Proposals are executed**

DKIST Critical Science Plan (CSP)

4. Feedback to DKIST. The existing (and future) Science Use Cases will inform the project about:

- Science most relevant to the community;
- Instruments, lines, modes of operation most requested (desired?) by the community;



- Allow definition of efficient operation, data management

DKIST Critical Science Plan (CSP)

As a community we must:

- understand forthcoming capabilities
- define science goals
- compile Science Use Cases
- coordinate to form a complementary set of PI lead teams
- convert Science Use Cases into PI led Observing Proposals

This will enable:

- Service Mode observations
- Scientific analysis
- PI led publication of first-light results

Important Points:

1. This process will likely be iterative – CSP structure (that you see on the website) is intended as a helpful but non-rigid framework and the science will evolve.
2. The CSP process is not exclusive (all welcome) nor unique (direct submission of observing proposals to the NSO DKIST Time Allocation Committee (TAC) under a standard submission and review process will also be possible). **The CSP (and this workshop) advantage is informational.**
3. Observing proposals developed as a result of participation in the DKIST Critical Science Plan effort (including this workshop) will be reviewed by the DKIST TAC along with proposals submitted outside of the CSP structure.
4. There is *no* automatic conversion of Science Use Cases to Observing Proposals – **success is dependent on continued engagement beyond this workshop proper and beyond the completed Science Use Case.**
5. The development of the CSP in advance of the start of operations helps the project beyond science definition – it helps in the development of essential operations and data management tools