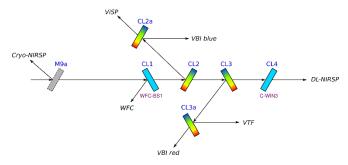
Facility Instrument Distribution Optics (FIDO):



The light distribution system on the Coudé floor of DKIST plays a central role in how multiple instruments receive light simultaneously. FIDO consists of a suite of dichroic beamsplitters, windows and mirrors most of which are interchangeable so as to maintain the ability to flexibly feed instruments with a variety of passbands in their design spectral ranges.

Concepts and Changeover Times:

Enabling the full potential of DKIST requires the simultaneous use of multiple instruments that operate within their specific design spectral ranges. Due to their versatility and flexibility, the spectral ranges of DKIST's instruments often overlap; the use of a particular type of instrument within a given wavelength band often depends critically on the scientific goal of the experiment.

FIDO feeds light to the instruments using an ensemble of interchangeable dichroic beamsplitters, windows and mirrors to facilitate many different optical configurations on the Coudé table. All positions in the FIDO path must have an optical element present.

Conceptually FIDO diverts short and passes long wavelengths with each successive beamsplitter encounter. One exception is the possibility of using C-WIN2 (below) in position CL2a to send 4% of the light to VBI blue as context imager for ViSP.

Changing from one optical configuration to another is a manual process that requires *up to one day* to complete. DKIST operations seeks to minimize the changeovers within proposal cycles.

An exception is the light distribution to the Cryo-NIRSP, which is fed by a quickly removable mirror at the location M9a. The Cryo-NIRSP receives all the light and can not operate simultaneously with any of the other DKIST instrumentation or the adaptive optics system, but this configuration can be accessed *within several tens of minutes*.

The first optical component at location CL1 is always the wavefront correction (WFC) beamsplitter which diverts 4% of the light to the adaptive optics system.

Available Optics:

Name	Reflected Band	Transmitted Band	Comment
C-BS465	380 – 440 nm	490 – 1800 nm	Standard Location: CL2A
C-BS555	380 – 530 nm	580 – 1800 nm	Standard Location: CL2
C-BS643	380 – 630 nm	656 – 1800 nm	Standard Location: CL3A
C-BS680	380 – 660 nm	700 – 1800 nm	Standard Location: CL3A
C-BS950	380 – 900 nm	1000 – 1800 nm	Standard Location: CL3
C-WIN1		380 – 900 nm	Transmission band AR coat
C-WIN2		380 – 1800 nm	Uncoated front surface
C-WIN3		500 – 1800 nm	Transmission band AR coat
			Standard Location: CL4
C-MIR1	380 – 1800 nm		Protected Silver coat
C-MIR2	380 – 1800 nm		Procurement is a GOAL

Beamsplitter Tool:

The DKIST Team provides a standalone tool to analyze whether a certain desired combination of instruments is feasible with FIDO. The tool aims to determine the optimal FIDO configuration for the use case based on the wavelength bands the user requests for each instrument.

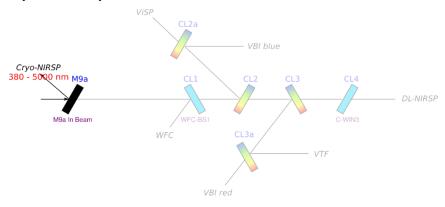
The tool is available for download through the DKIST CSP webpages. For assistance email DKISTCSP@nso.edu. 6 November 2018

Example Configurations:

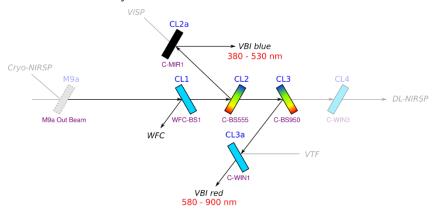
Components:



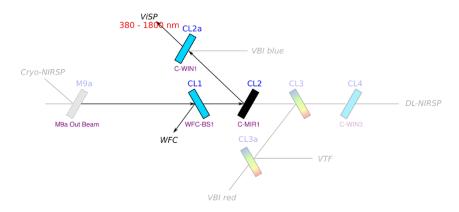
Cryo-NIRSP only:



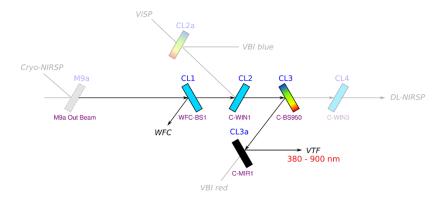
VBI red and blue only:



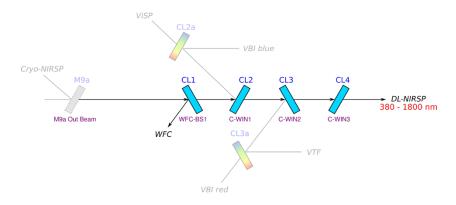
ViSP only:



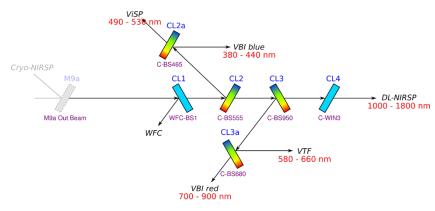
VTF only:



DL-NIRSP only:



Example Multi –Instrument Configuration 1:



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Example Multi – Instrument Configuration 2:

