



# DKIST First Light Instrument Capabilities



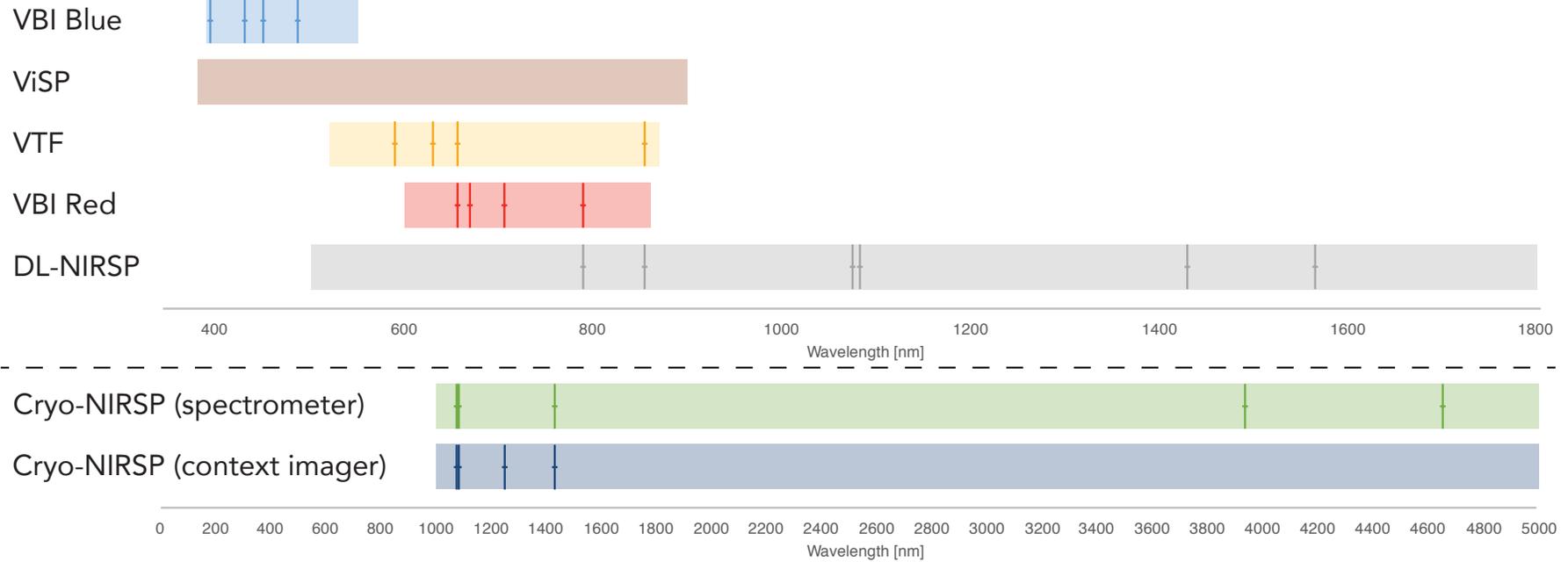
	Instrument type	Spectral range	Spectral resolution	Spatial sampling	Maximum Instantaneous Field of View	Maximum Sampled Field of View	Peak Cadence	Analogous Instruments
Visible Broadband Imager <i>VBI (Blue)</i>	High Cadence, High Resolution Imager	390-550nm (sequential filter sequencing)	N/A	0.011"	45" x 45"	2' x 2' (sequential field sampling)	3.2 sec (reconstructed) 0.03 sec (raw images)	ROSA, Hinode/BFI <i>High cadence, high spatial resolution</i>
Visible Spectropolarimeter <i>VISP</i>	Scanning Slit Spectropolarimeter	380-900nm (3 spectral windows at a time)	>180,000	0.0195" (arm 1) 0.0236" (arm 2) 0.0295" (arm 3) [sampling along slit]	5 slits Width x Length 0.028" or 0.041" or 50" (arm 1) 0.053" or x 60" (arm 2) 0.106" or 75" (arm 3) 0.214"	Slit length x 2'	0.5-10 sec per slit position (polarimetry) 0.02-0.2 sec per slit position (intensity-only)	SPINOR, Hinode/SP, IRIS, GRIS <i>Scanning spectrograph, high spectral fidelity</i>
Visible Tunable Filter <i>VTF</i>	Fabry Perot Imaging Spectropolarimeter	520-870nm (sequential scans through multiple spectral lines)	FWHM 6-8 pm	0.014"	60" x 60"	60" x 60"	Typical scan times per spectral line: 0.5-2 s (intensity only); 2-10 s (polarimetry)	IBIS, CRISP, GFPI <i>Imaging spectropolarimeter</i>
Visible Broadband Imager <i>VBI (Red)</i>	High Cadence, High Resolution Imager	600-860nm (sequential filter sequencing)	N/A	0.017"	69" x 69"	2' x 2' (sequential field sampling)	3.2 sec (reconstructed) 0.03 sec (raw images)	ROSA, Hinode/BFI <i>High cadence, high spatial resolution</i>
Diffraction Limited Near Infrared Spectropolarimeter <i>DL-NIRSP</i>	Integral Field Unit Spectropolarimeter	500-900nm 900-1350nm 1350-1800nm (1 filter band per channel)	125,000	0.03" (high res) 0.077" (mid res) 0.464" (wide field)	2.4" x 1.8" (high res) 6.16" x 4.62" (mid res.) 27.84" x 18.56" (wide)	2' x 2'	Depends on resolution and total field of view. E.g. 6s for one tile, on-disk, high resolution, full polarimetry	SPIES <i>True Imaging Spectropolarimeter: simultaneous 2D FOV and spectral information using fiber-fed IFU</i>
Cryogenic Near Infrared Spectropolarimeter <i>Cryo-NIRSP</i>	Scanning Slit Spectropolarimeter	1000-5000nm (1 filter band at a time. About 70 s to switch filters)	100,000 on-disk 30,000 off-limb	0.12" [along slit] (no Adaptive Optics)	2 slits 0.15" x 120" slit 0.5" x 240" slit	4' x 3' (near limb) 5' round (off-limb)	Heavily depends on signal to noise. Maximum frame rate is 10 frames per second e.g. 1s per slit position near-limb/chromosphere	CYRA (BBSO) <i>Cryogenic, scanning spectrograph, novel diagnostics</i>
Cryo-NIRSP <i>Context Imager</i>	Imager	1000-5000nm (1 filter band at a time, with fast switching time to support sequential observations during a single-band spectrograph scan.)	N/A	0.052" (no Adaptive Optics)	100" x 100"	4' x 3' (near limb) 5' round (off-limb)	Heavily depends on signal to noise. Maximum frame rate is 10 frames per second e.g. 1s per slit position near-limb/chromosphere	CYRA (BBSO) <i>Cryogenic, scanning spectrograph, novel diagnostics</i>

This table is meant to give an idea of the capabilities of the DKIST first light instrument suite. It cannot capture the large trade space that is provided by the flexibility of the instruments. For more information, visit <http://dkist.nso.edu/CSP/instruments>





# DKIST First Light Instrument Filters



VBI Blue	ViSP	VTF	VBI Red	DL-NIRSP	Cryo-NIRSP	Cryo Context
Ca II K 393.327nm	Access to entire spectral range between 380-900 nm	Na D 589.6nm	H-alpha 656.282nm	Fe XI 789nm	Fe XIII 1074.7nm	Fe XIII 1074.7nm
G-band 430.52nm		Fe I 630.25nm	Continuum 668.423nm	Ca II 854.2nm	Fe XIII 1079.7nm	He I 1083nm
Continuum 450.287nm		H-alpha 656.3nm	Ti O 705.839nm	Fe XIII 1074.7nm	He I 1083 nm	J Band 1250nm
H-beta 486.1nm		Ca II 854.2nm	Fe XI 789.186nm	He I 1083nm	Si X 1430nm	Si IX 1430nm
				Si X 1430nm	Si IX 3935 nm	
				Fe I 1565nm	CO 4651nm	

This table is meant to give an idea of the capabilities of the DKIST first light instrument suite. It cannot capture the large trade space that is provided by the flexibility of the instruments. For more information, visit <http://dkist.nso.edu/CSP/instruments>

Visible light cameras for instruments are provided by a UK consortium.

