

MIMIZUKU (Mid-Infrared Multifield Imager for gaZing at the UnKown Universe) is a mid-infrared imager and spectrograph for the University of Tokyo Atacama Observatory (TAO) 6.5-m telescope.

Key concepts are:

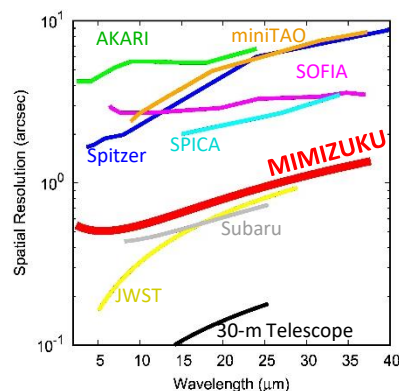
- 1) **Wide wavelength coverage (2-38 μm) including 30- μm wavelength range.**
- 2) **High spatial resolution achieving $\lesssim 1''$ in mid-infrared wavelengths.**
- 3) **Accurate monitoring with multi-field imaging/spectroscopy.**

Specifications of MIMIZUKU

Channel	NIR	MIR-S	MIR-L
Observation Mode	Imaging & Spectroscopy		
Wavelength	2.0–5.3 μm	6.8–26 μm	24–38 μm
Detector	HgCdTe 1k	Si:As 1k	Si:Sb 128
Pixel Scale	0."069/pix	0."11/pix	0."24/pix
Field of View	Normal	2.'0 \times 2.'0	31" \times 31"
	Multi-Field	1.'2 \times 0.'6 \times 2 fields	2.'0 \times 1.'0 \times 2 fields
Spatial Resolution	Seeing-limit (~0.5 arcsec)	Diffraction-limit (0.5 – 0.9 arcsec)	Diffraction-limit (0.9 – 1.3 arcsec)
Spectroscopy	KL-band: 2.1-4.0 μm , R=210	N-band: 6.8-14 μm , R=170	30- μm band: 26-38 μm , R=64 (Optional)
	LM-band: 2.8-5.3 μm , R=110	Q-band: 17-26 μm , R=100	
	2.7 μm -band: 2.4-2.95 μm , R=620		



MIMIZUKU at Mitaka Lab. Dimensions are 2.0 \times 2.0 \times 2.1 m³. Weight is 2.5 tons.



Spatial resolution of mid-infrared instruments. MIMIZUKU achieves the highest spatial resolution at 26-38 μm .

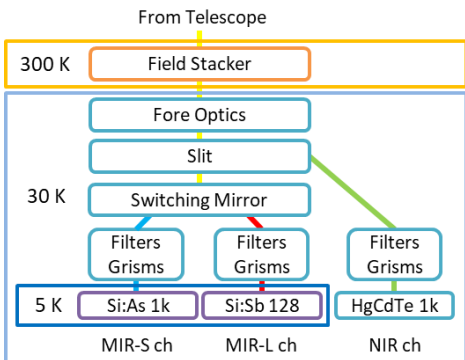
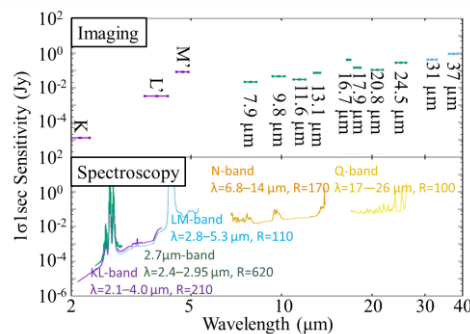


Diagram of the MIMIZUKU optics.

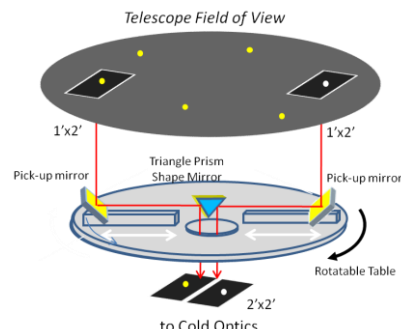
The optics of MIMIZUKU consists of warm optics called Field Stacker and cold optics. The cold optics have three optical channels with three different detectors. The MIR-S channel has a 1k-format Si:As array, which covers 6.8-26 μm . The MIR-L channel has a 128-pix-format Si:Sb array covering 24-38 μm . The NIR channel covers 2.0-5.3 μm with a 1k-format MCT array.

The field stacker is a newly invented optical unit to achieve accurate photometry in the mid-infrared wavelengths. It consists of two pick-up mirrors and a prism-shaped mirror. These are placed on a rotation table. The pick-up mirrors can also move along the radial direction of the rotation table, and pick up two separate fields in the telescope field-of-view. The picked-up beams are brought to the prism-shaped mirror, combined into a single beam, and then led to the cold optics.

Thus the field stacker enables us to observe two arbitrary fields, i.e. more than two stars simultaneously. It dramatically improves the accuracy, reliability, and feasibility of photometric and spectroscopic observations.



Expected sensitivity of TAO/MIMIZUKU.



Schematic drawing of the field stacker.

For further information:

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Operation at TAO Starts in FY2021!!