VASTA

Low-temperature Measurement Solution

About VASTA

VASTA PTE. LTD. provides instruments and components for scientific research and industrial R&D.

We provide complete physical property measurement solutions at low temperature and high magnetic field.

Our products focus on optimization of every detail of low-temperature electrical transport measurement experiment, including sample loading, sample protection, sample manipulation, signal transmission, etc. Our products work with various superconducting magnet systems.

We provide fast delivery, cutting-edge technology, and responsive service to customers worldwide.

Key Offering

1) Multi-function probes (fixed-position probe, vacuum probe, dual-position probe, 64-pin high-throughput probe, RF probe, thermal transport probe, etc.)

2) Rotation probes (single-axis rotation, 2-axis rotation, rotation in vacuum, rotation with high-frequency channels, etc.)

3) Low-temperature SPM probe (AFM and MFM, etc.)

4) Measurement accessories (multi-channel break-out box, twisted-pair shielded cable, room temperature RC filter, sapphire non-magnetic chip carriers, sealed sample holder, ESD protection mini-probe, etc.)

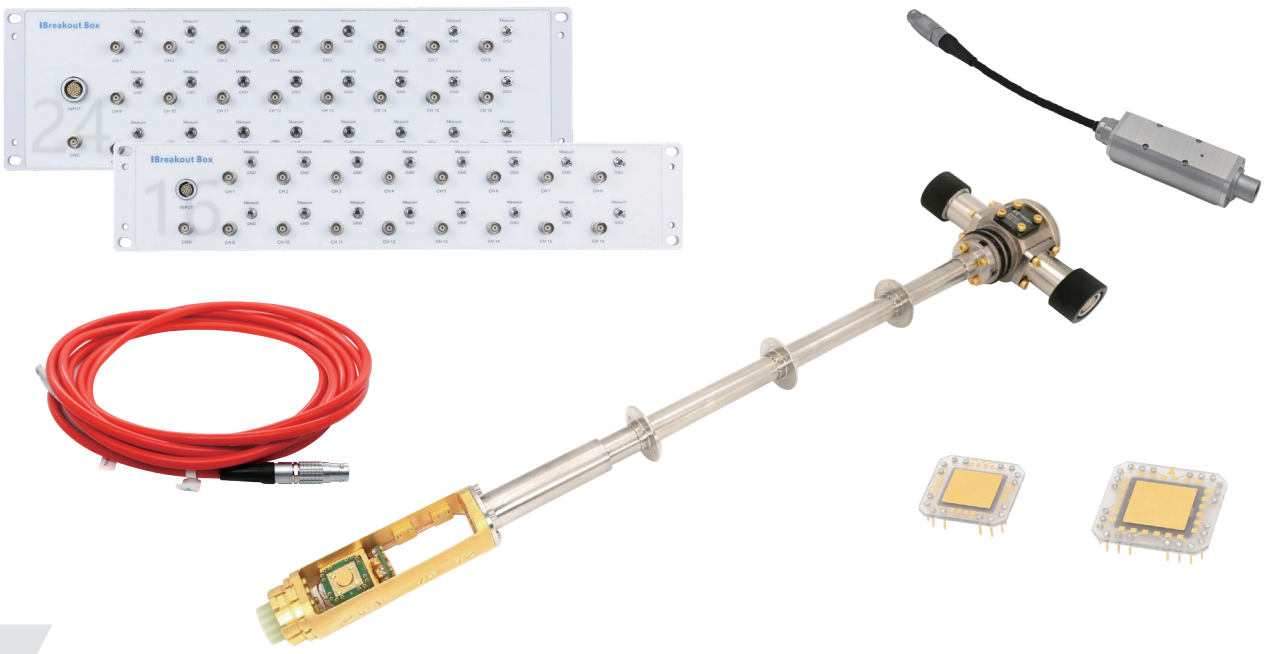
5) Filtering for DC (RC filter, silver-epoxy filter, copper-powder filter)

6) Single crystal samples (superconductors, semiconductors, topological materials, magnetic materials, TMDs, etc.)

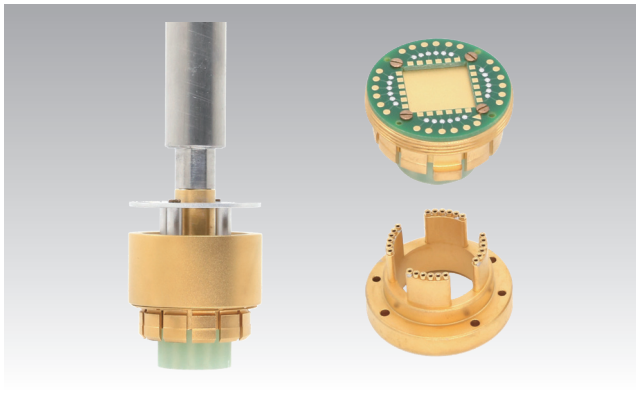
Typical Applications

1) Transport measurement under extreme conditions

2) Advanced condensed matter physics research (low-dimensional materials, topological physics, strongly correlated systems, spintronics, thermal electronics, high-pressure physics, etc.)

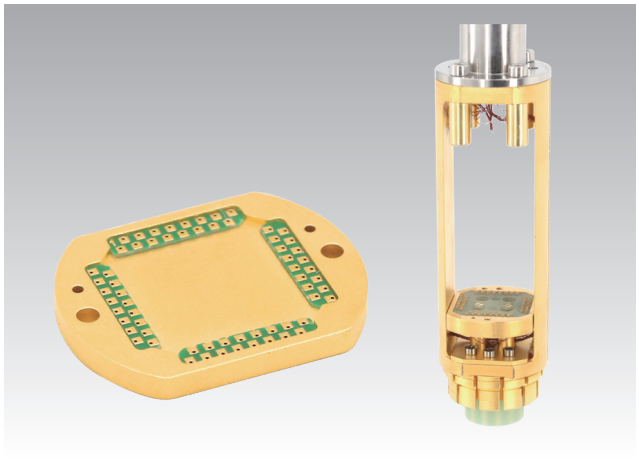


Low-temperature Multi-function Probe



Standard 24-pin Probe

- 24 measurement channels with 10.5 mm x 10.5 mm sample area
- Integrated sample platform with improved thermalization
- Full-time grounding protection during the wire-bonding to cooling process
- Complete thermal shielding design, suitable for various thermal measurements



High-throughput 64-pin Probe

- More channels: 64 measurement channels without reducing the sample area
- Cernox thermometer on the sample holder for accurate sample temperature monitoring
- Gold-plated oxygen-free copper sample holder for improved thermal conductivity and temperature control accuracy
- Low-noise signal lines with lower resistance and smaller thermoelectric potential and low heat-load.
- Minimized (less than 0.2K) temperature difference between the real sample temperature and the system setting temperature

The multi-function probes offers various options for low-temperature transport measurement, available options are fixed-position probe, vacuum probe, dual-position probe, 64-pin high-throughput probe, RF probe, thermal transport probe, etc.

Specifications:	VS-SP26-FX24	VS-SP26-FX64	VS-SP50-FX24
Compatible VTI size/diameter	26 mm	26 mm	50 mm
Probe wiring capacity	24	64	24
Sample area dimension	10.5 mm x 10.5 mm	12 mm x 12 mm	12.5 mm x 12.5 mm
Sample plane orientation	Magnetic field(Z) out-of-plane		
Applicable temperature range	1.5 K to 320(400) K		
Applicable maximum magnetic field	20 T		
Maximum withstand voltage	200 V		
Leakage current	<5 nA@100 V, 300 K		
Additional upgrade options	LCC20/LCC44/2x8 DIL chip holder; in-plane or dual-position; vacuum; high-frequency; thermal transport; detachable cells; customized features		

Low-temperature Rotation Probe

Features & Benefits

- Customizable probe size available for various magnet VTI systems
- Vacuum sample space upgrade available
- Manual or automatic rotation control
- 16/24 electrical channels for improved measurement efficiency
- Smooth rotation with high reliability and repeatability
- Non-magnetic gold-plated chip carriers

This probe is designed to perform electrical transport measurements in low temperatures with sample rotating relative to a high magnetic field. It can work in a rotation range of -10 to 370 degrees, a magnetic field of up to 20 Tesla, and a low temperature of 1.5 Kelvin.

A Cernox temperature sensor is attached to the sample rotating platform, which can monitor the sample temperature precisely. It has a sapphire sample holder with enhanced thermal conductivity and electrical insulation.

The rotation probe can be integrated with extra degrees of freedoms including in-plane and out-of-plane rotation, high frequency RF signals, high-pressure cell, etc.

Specifications:	VS-SP26-RT	VS-SP50-RT
Compatible VTI size/diameter	26 mm	50 mm
Probe wiring capacity	16	24
Sample area dimension	10 mm x 10 mm	12.5 mm x 12.5 mm
Sample rotation orientation	out-of-plane or in-plane	
Rotation range	-10° to 370°	
Backlash	<1°	
Angular resolution	<0.01°	
Rotation speed	0.2°/s to 10°/s	
Applicable temperature range	1.5 K to 320(400) K	
Applicable maximum magnetic field	20 T	
Maximum withstand voltage	200 V	
Leakage current	<5 nA@100 V, 300 K	
Additional probe options	in-plane rotation; vacuum; high frequency; 2-axis rotation; customized features	

* via changing in-plane chip carriers

Low-temperature 2-axis Rotation Probe

Hybrid 2-axis Rotation Probe(VS-SP50-2XRTH)

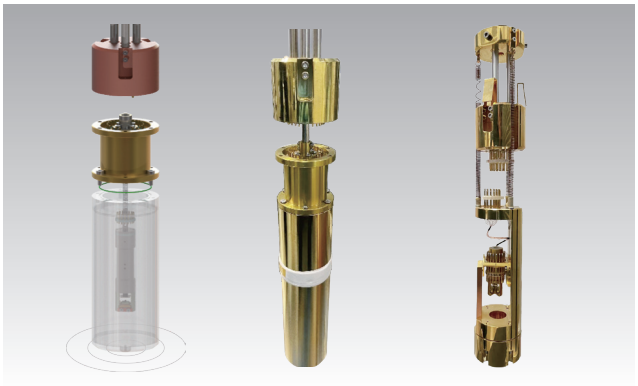
- Out-of-plane rotation (primary-axis) is controlled by a stepper motor at room temperature or manually.
- In-plane rotation (secondary-axis) is controlled by a piezo-stage rotator.
- 16 DC measurement channels with low-noise signal lines
- Demountable rotator stage for easy modification and can be swapped with standard chip carrier for single-axis rotation
- Cernox sensor on the sample stage for accurate temperature monitoring
- Annular heater and thermal radiation shield for enhanced temperature uniformity and stability

Mechanical 2-axis Rotation Probe(VS-SP50-2XRTM)

- Both the out-of-plane rotation (primary-axis) and the in-plane rotation (secondary-axis) are controlled by the stepper motor at room temperature or manually.
- 16 DC measurement channels with low-noise signal lines (customizable with higher wiring capacity)
- Cernox sensor on the sample stage for accurate temperature monitoring
- Annular heater and thermal radiation shield for enhanced temperature uniformity and stability

Specifications:	VS-SP50-2XRTM	VS-SP50-2XRTH
Compatible VTI size/diameter	50 mm	50 mm
Probe wiring capacity	16 (up to 44)	16
Sample area dimension	10 mm x 10 mm	10 mm x 10 mm
Out-of-plane rotation: angle range	-10° to 370°	
Out-of-plane rotation: backlash	<1°	
Out-of-plane rotation: angle resolution	<0.01°	
In-plane rotation: angle range	-10° to 370°	360° endless
In-plane rotation: angle resolution	<0.01°	50 m°
Applicable temperature range	1.5 K to 400 K	1.5 K to 320 K
Applicable maximum magnetic field	20 T	
Maximum withstand voltage	200 V	
Leakage current	<5 nA@100 V, 300 K	

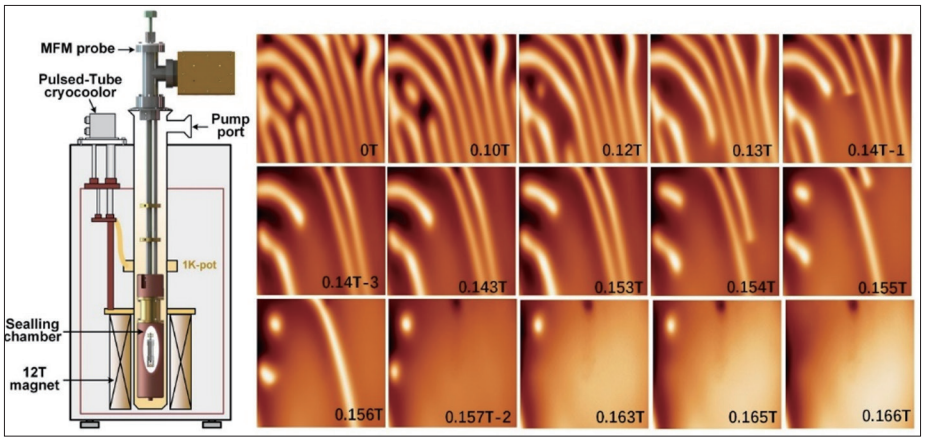
Low-temperature SPM probe



Features & Benefits

- Surface imaging options: AFM/ MFM with piezo-resistance tip
- Sample preparation and encapsulation in a glove box for air-sensitive samples
- Compact design to work with various VTI systems
- Compatible with commercial SPM controllers
- Upgrade options: sample rotation, transport measurement, microscopic samples, etc.

The low-temperature scanning probe microscopy (SPM) probe enables high-precision imaging of electronic states, magnetic domain structures, surface topography, and micro-conductivity of 2D materials in low-temperature and high-magnetic-field environments. Its patented, detachable scanning head allows for glovebox-based sample preparation, making it ideal for air-sensitive materials while also enabling easy replacement to accommodate a variety of research needs. Designed for seamless integration with standard VTI chambers and offering customization options, it provides exceptional flexibility for laboratory applications.



Real-space imaging of magnetic structures in a bulk CrVI6 single crystal at 5K (scan size 15 μm x15 μm).

Recent publications:
Appl. Surf. Sci. 673, 160846 (2024)
Rev. Sci. Ins. 95, 013701 (2024)
Nat. Phys. 20, 1145 (2024)

Specifications:	VS-SP26-SPM	VS-SP50-SPM
Compatible VTI size/diameter	26 mm	50 mm
Sample area	7 mm x 7 mm	15 mm x 15 mm
Applicable temperature range	1.5 K to 325 K	
Applicable maximum magnetic field	18 T	
Probe wiring capacity	4	
SPM controllers	In-house controller or RHK/ Nanonis etc.	
Scaning range	50 μm x 50 μm@300 K, 15 μm x 15 μm@5 K	
AFM/MFM resolution	Z-axis resolution <100 pm(AFM mode) Lateral resolution <50 nm(MFM mode)	

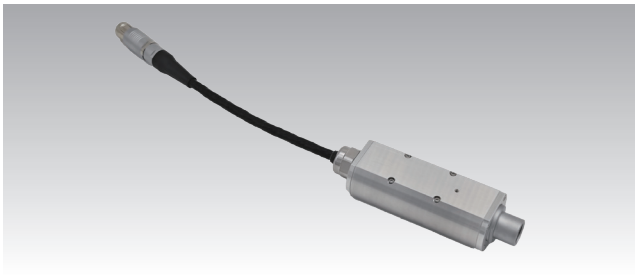
Measurement Accessories

Multi-channel Break-out Box

- 12/16/24 channels available
- Individually controlled channels
- Compact design for space-tight layout
- Compatible with standard rack

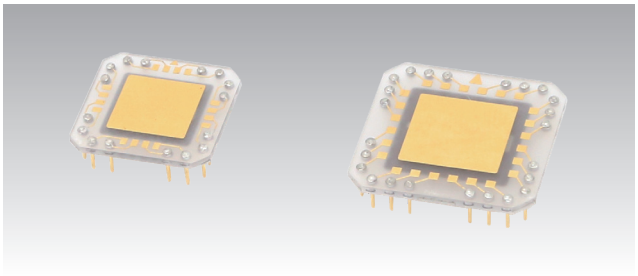
Twist-pair Shielded Cable

- Customizable cable length
- Globally shielded
- Fischer/ Lemo connectors
- Over 50 Ω insulation



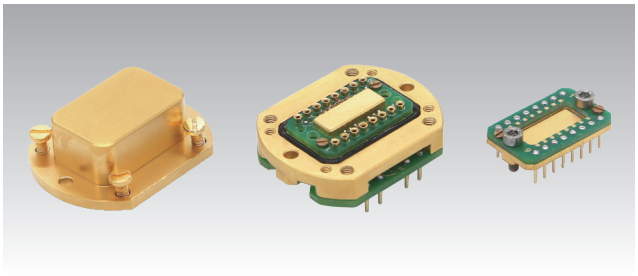
Room Temperature RC filters

- Immediate noise filtering at the RT side to effectively suppress the spatial electromagnetic interference from the environment
- 24 channels compact design with Fischer connector
- Cut-off frequency @175 kHz (customizable)



Sapphire Non-magnetic Chip Carriers

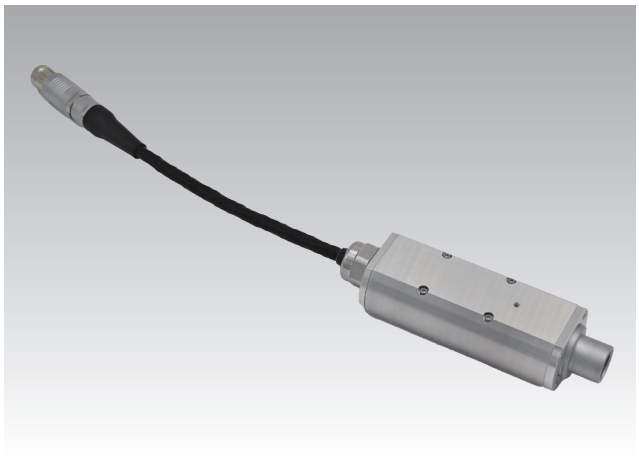
- Sapphire substrate for high thermal conductivity and electrical insulation
- 24pin (12.5 mm x 12.5 mm) & 16pin (10.5 mm x 10.5 mm) options
- In-plane and out-of-plane options



Sealed Sample Holder

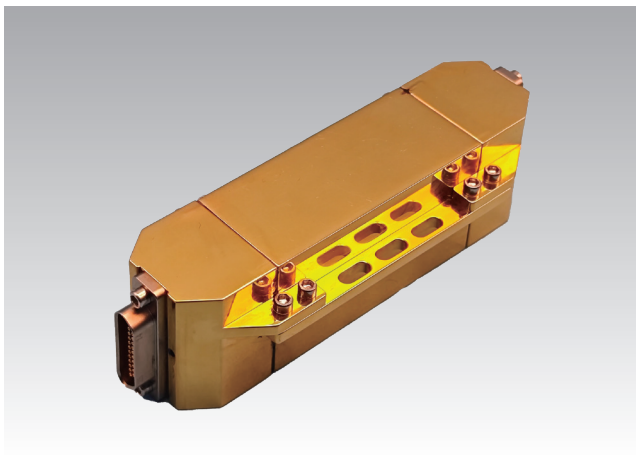
- O-ring/indium sealed sample holder for sensitive sample preparation holder for sensitive sample preparation
- Sample is electrically connected and sealed in protective gas
- Upgradable to vacuum transfer cage

Filtering for DC

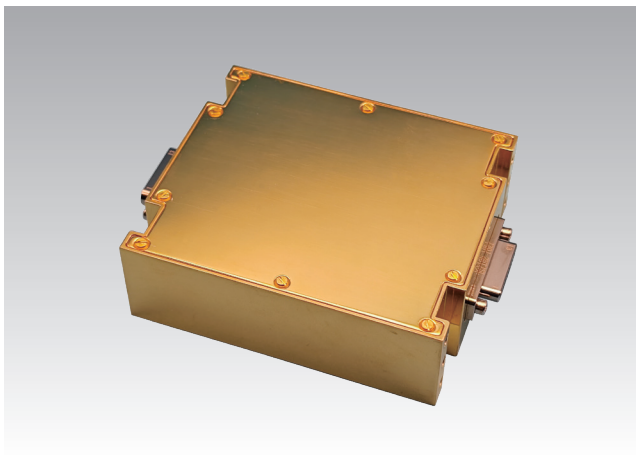


Room-temperature RC Filter
(VS-FLT-RCRT, cut-off freq. 175 kHz)

Cryogenic RC Filter
(VS-FLT-RC, cut-off freq. 17 kHz)



Silver-epoxy RF filter
(VS-FLT-RFSE, cut-off freq. 1300 kHz)

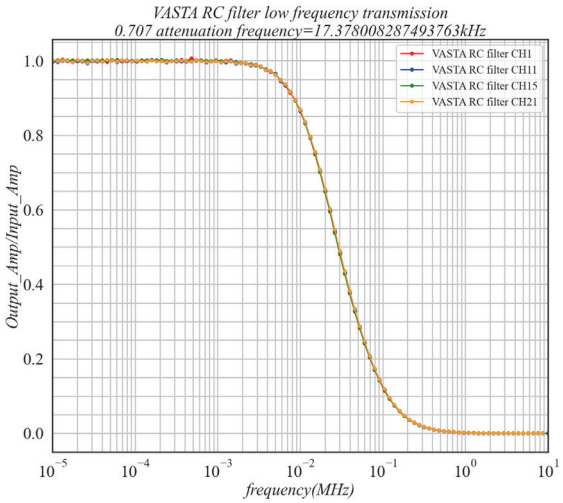


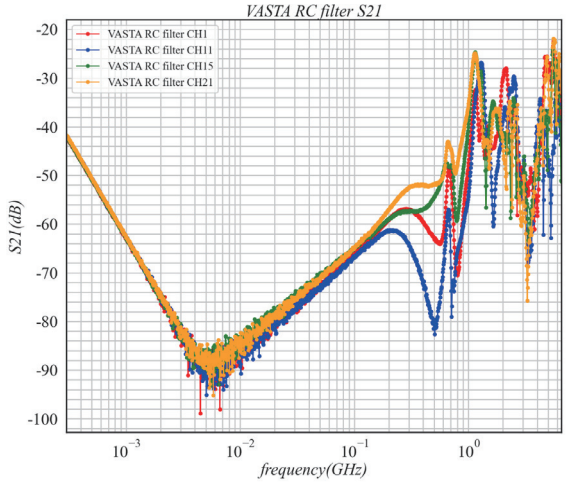
Copper-powder RF Filter
(VS-FLT-RFC, cut-off freq. 700 kHz)

Specifications		VS-FLT-RCRT	VS-FLT-RC	VS-FLT-RFSE	VS-FLT-RFC
Electrical property	Filter type	RC	RC	Silver epoxy	Copper powder
	Channel number	24	24	24 (1)	24 (1)
	Cut-off frequency (input impedence 1 MΩ)	175 kHz	17 kHz	1.3 MHz	700 kHz
	-100 dB point (input impedence 50 Ω)	/	/	300 MHz	1.5 GHz
	Channel resistance	100 Ω	940 Ω	3.4 Ω	5 Ω
	Capacitance to GND	6.6 nF	20 nF	2.5 nF	0.25 nF
	Insulation	100 GΩ @10 V, 300 K			
	Voltage rating	200 V			
Physical property	Working temp.	300 K	4 K and 10 mK	10 mK and above	10 mK and above
	Connector type	Fischer/ LEMO	Micro-D	Micro-D (SMA)	Micro-D (SMA)
	Modular capacity	136x42x42 mm	65x41x12.5 mm	95x30x24 mm (90x10x10 mm)	81x69x25.5 mm (90x10x10 mm)

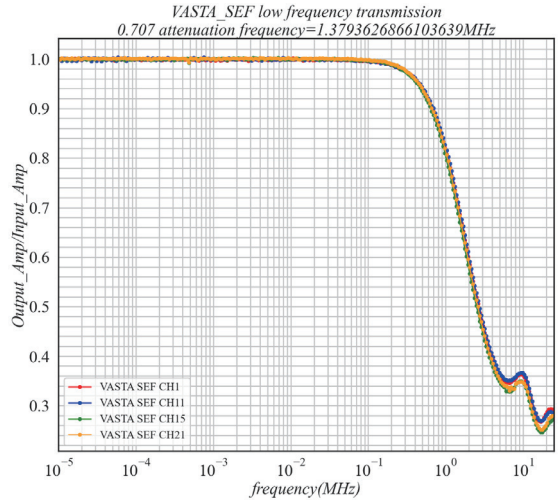
Filtering for DC

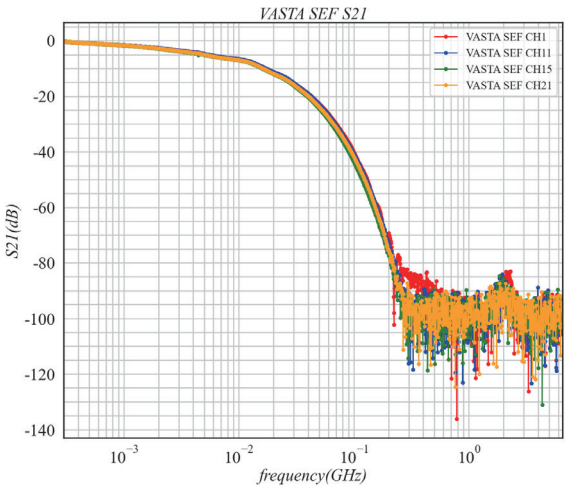
4K RC Filter Performance at Low and High Frequency Range



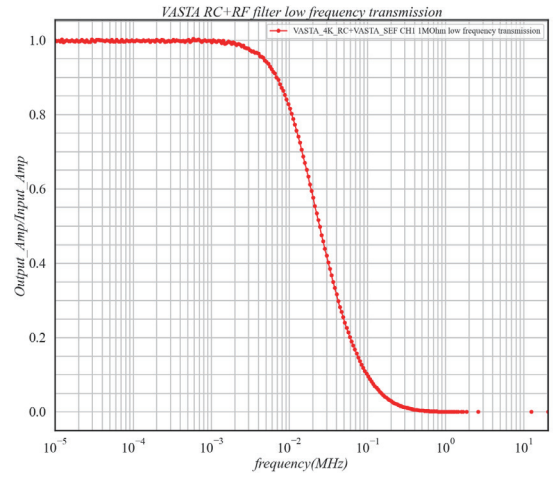


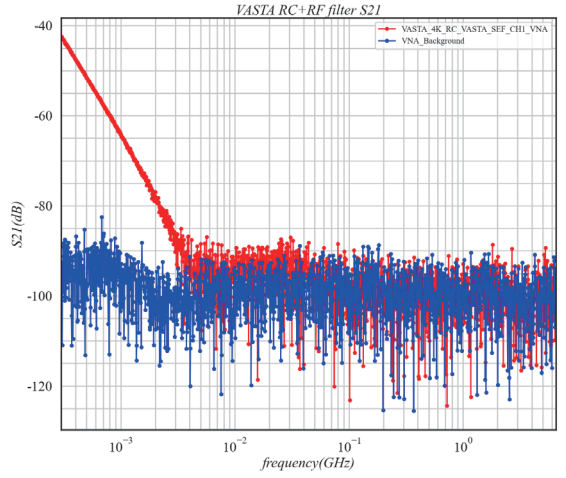
Silver-epoxy RF Filter Performance at Low and High Frequency Range





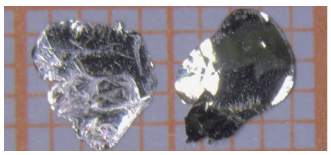
4K RC Filter + Silver-epoxy RF Filter Cascade Performance at Low and High Frequency Range

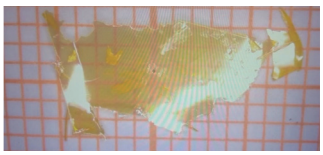


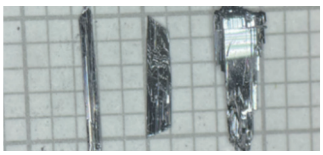


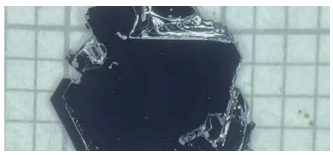
Single Crystal Samples

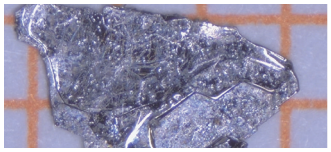
We provide various type of single crystal samples for physics research, including superconductors, semiconductors, topological materials, magnetic materials, TMDs, etc. Customized single crystal available upon request.

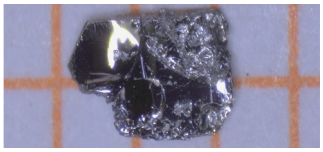

$NbSe_2$

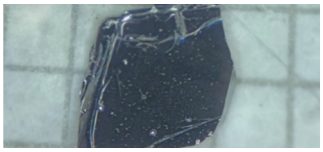

$CuInP_2S_6$

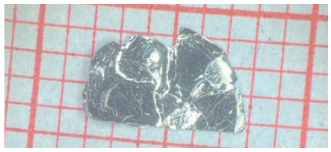

Bi_4Br_4

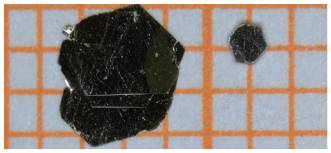

CsV_3Sb_5

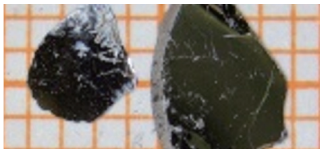

Kv_3Sb_5

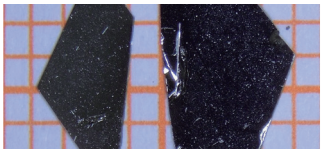

Rbv_3Sb_5

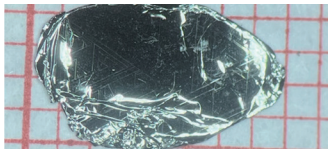

$CeAlGe$

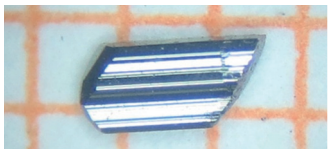

$MnBi_4Te_7$


Fe_5GeTe_2


Fe_3GeTe_2


$Cr_2Ge_2Te_6$


$PbTaSe_2$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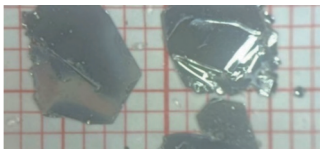
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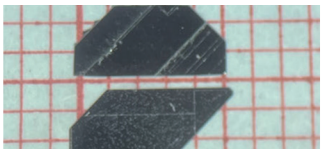
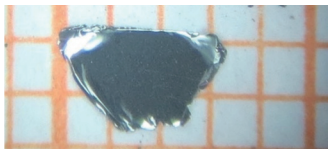
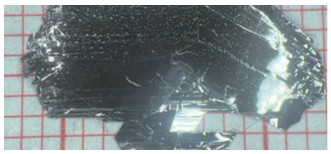
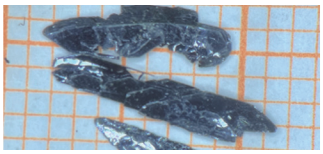
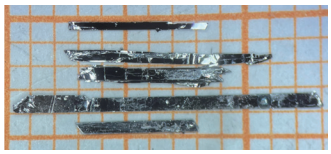

$NbAs$


$ZrSe_2$


$ZrTe_3$


$ZrTe_5$


$CrBr_3$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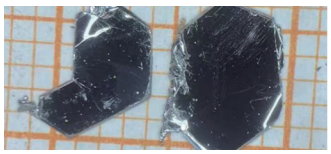
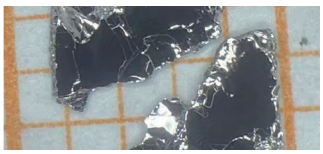
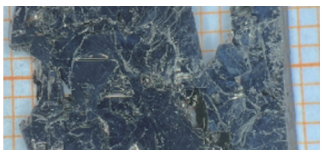
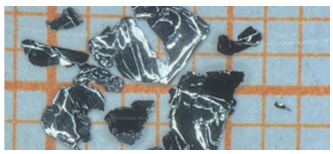
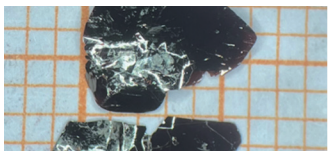

$2H\text{-}MoTe_2$


$Ta_2Pd_2Te_5$


$Fe_{1.06}Te$


$FePSe_3$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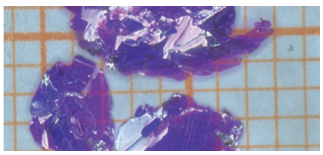
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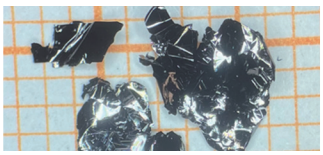
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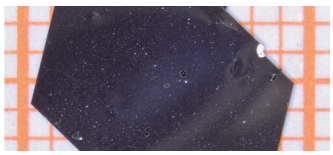
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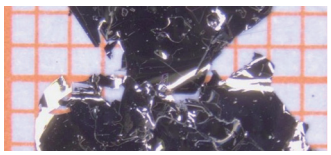
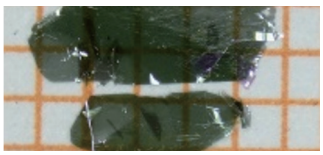

NiI_2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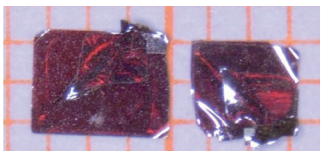
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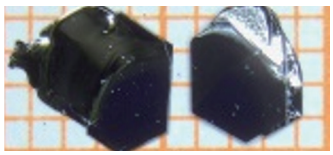
$CoNb_3S6$

VASTA PTE. LTD.

81 AYER RAJAH CRESCENT #03-56
SINGAPORE 139967
info@vasta.sg

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