

## Multiple Experiment Cryogenic Cooling System

### Key Features

- Provides 4K Directly at Sample Point
- Flexible Line Up to 6 feet Long
- Plugs into Multiple Experimental Cryostats
- Completely Closed Cycle - No More Liquid Helium

### Benefits

- Increased Lab Productivity
- Prepare Samples in Advance
- Off-Table Cryocooler
- Works in Any Orientation
- Ultra Low Vibration
- Freedom of Movement



# How Does It Work?

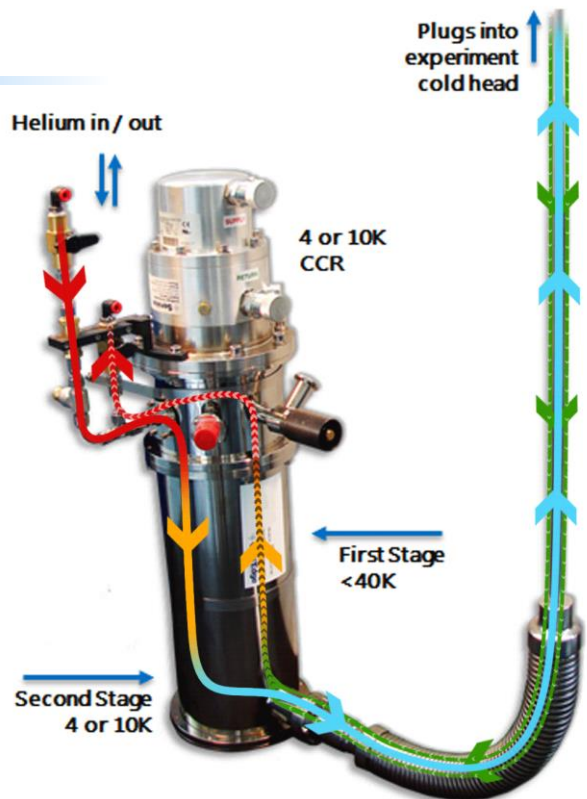
A completely closed cycle system that uses a 4K or 10K refrigerator (GM or Pulse Tube cycle)

First Stage:	<40K
Second Stage:	4K or 10K
Third Stage:	4K directly at sample

## Third Stage Details

Closed loop helium gas flow with re-circulator

- Gas flows through Stinger transfer line to cool the experimental cold head
- Used gas returns to CCR via transfer line
- Gas exits CCR to be re-circulated by pump



## Plug and Perform

Similar to how a liquid helium Dewar can be rolled around and inserted into different cold heads, the Stinger can be cooled and moved between cryostats - all within a closed cycle.

# Stinger Flexible Line



## “Cool Around the Corner”

Allows for a wide range of movement while the experimental head is cold.

- XYZ translation for microscope heads
- Navigate UHV chambers with ease
- Less stiff than typical LHe transfer line
- Custom line lengths (18in - 6ft) 45cm - 122cm



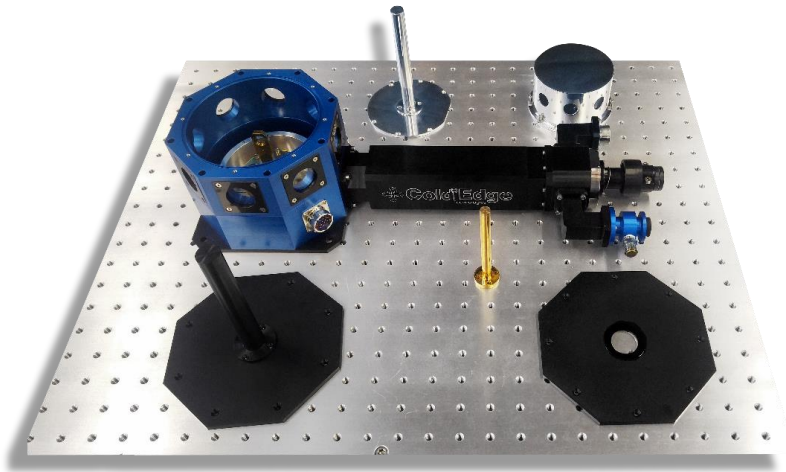
## Ultra Low Vibration

Flexible line bleeds off vibration energy without compromising experimental data.

## Lowest Vibration Commercially Available

Combining the Flex Line, Ultra Low Vibration Interface, and Pulse Tube Setup results in less than 10 nanometer displacement at the sample point.

# <4K – 1000K Modular Cryostat



Interchangeable components allow researchers to transition between multiple interfaces.

- Optical (pictured)
- Non-optical
- Narrow Gap
- Integrated Microscope Objectives



VACUUM COVER WITH WINDOW



OPTICAL VACUUM ADAPTER



OPTICAL RADIATION SHIELD



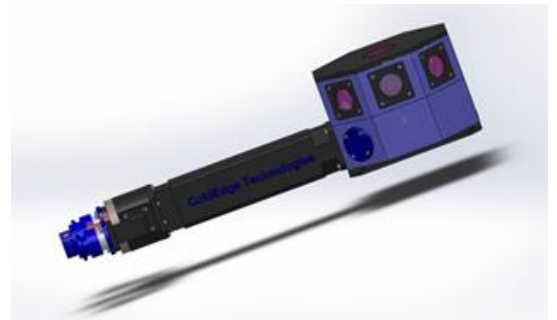
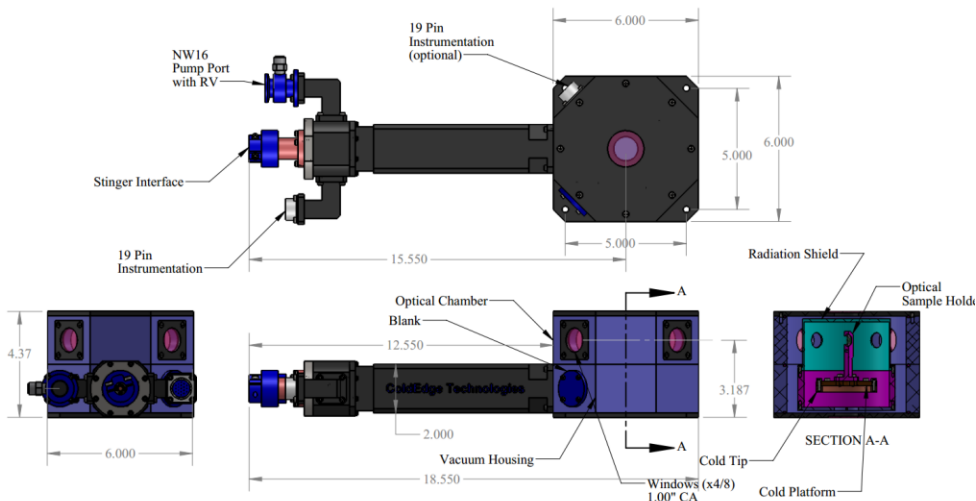
OPTICAL SAMPLE HOLDER



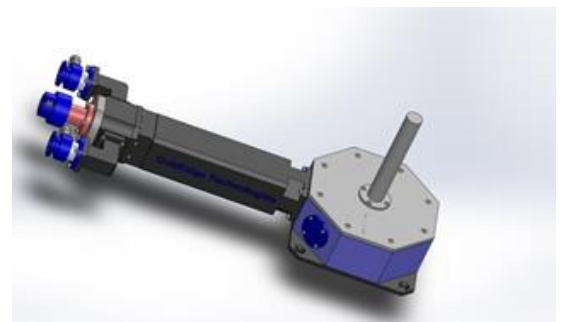
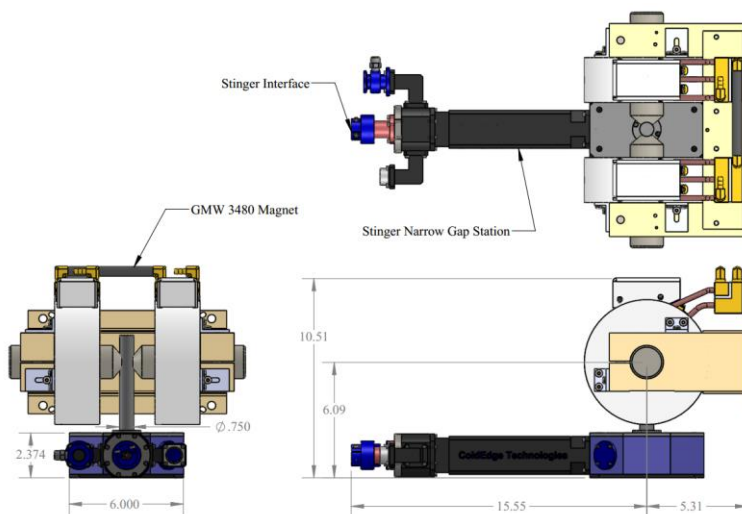
MODULAR BASE

# Sample Stinger Cryostats

## Modular Optical Microscope Platform

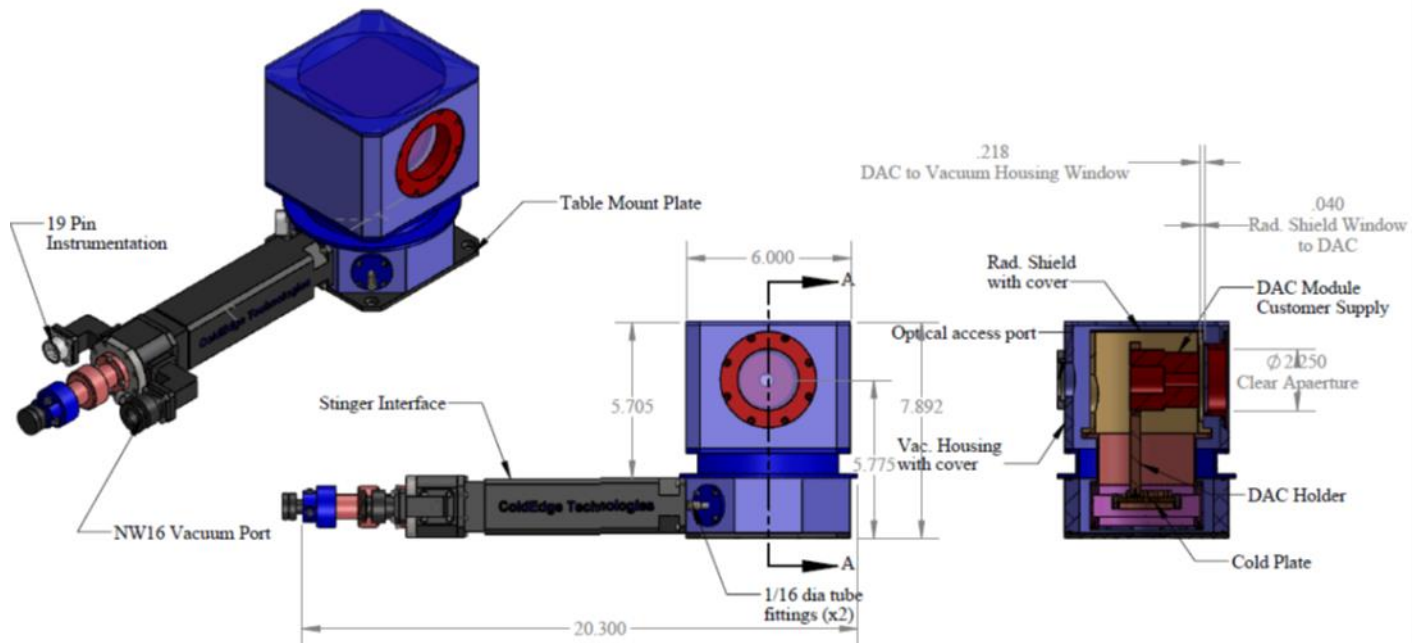


## Narrow Magnet Gap

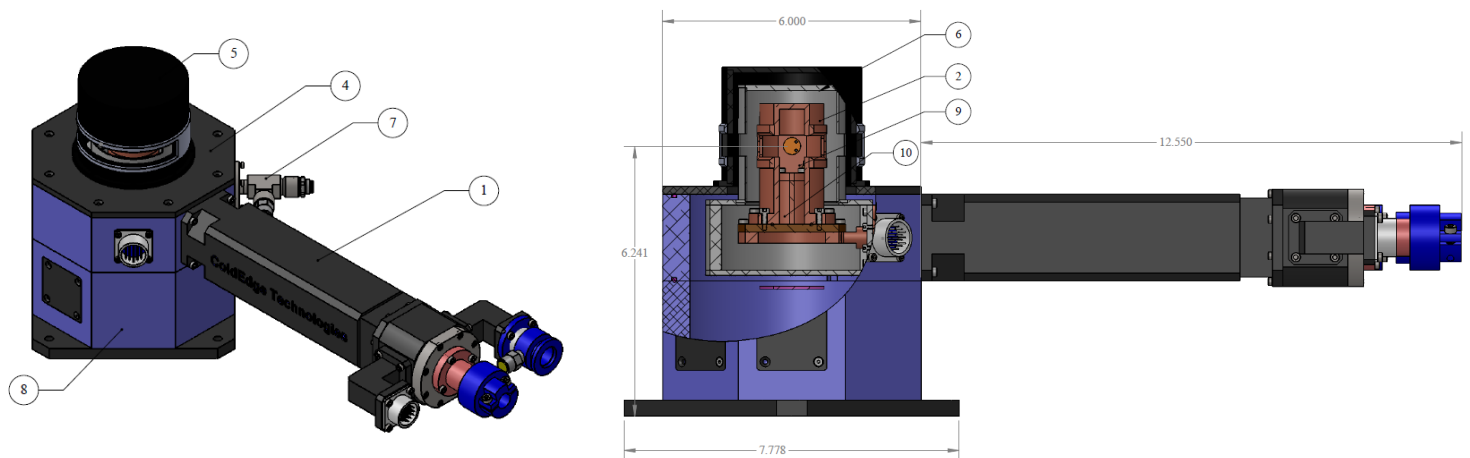


# Sample Stinger Cryostats

## Diamond Anvil Cell, Flat Window Access

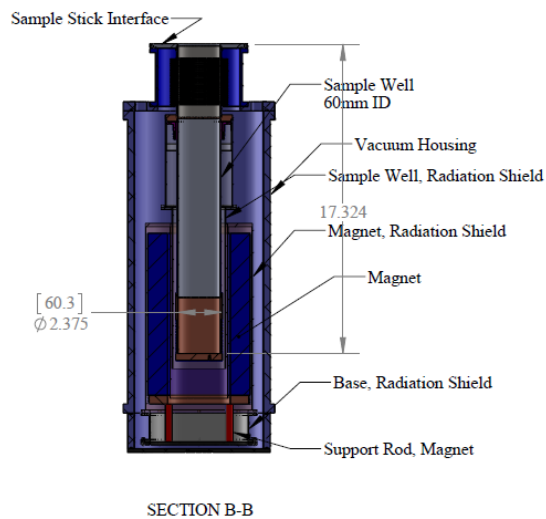
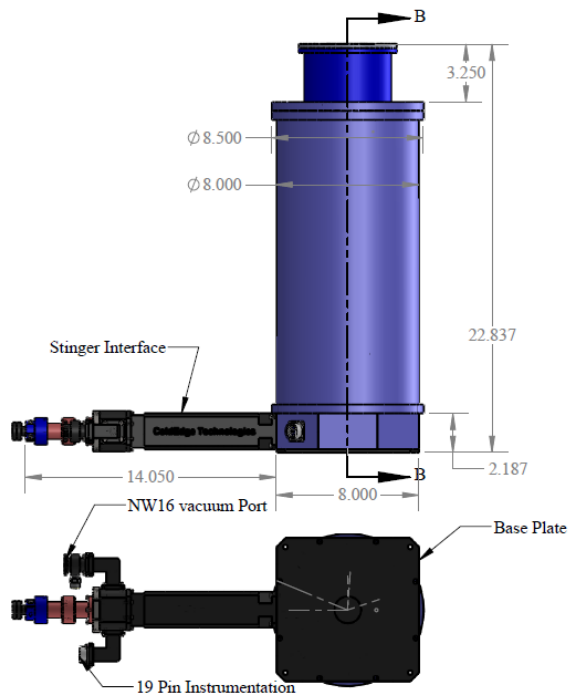


## X-Ray Module with 180° Window



# Sample Stinger Cryostats

## 7T Magnet with 60mm Sample Well

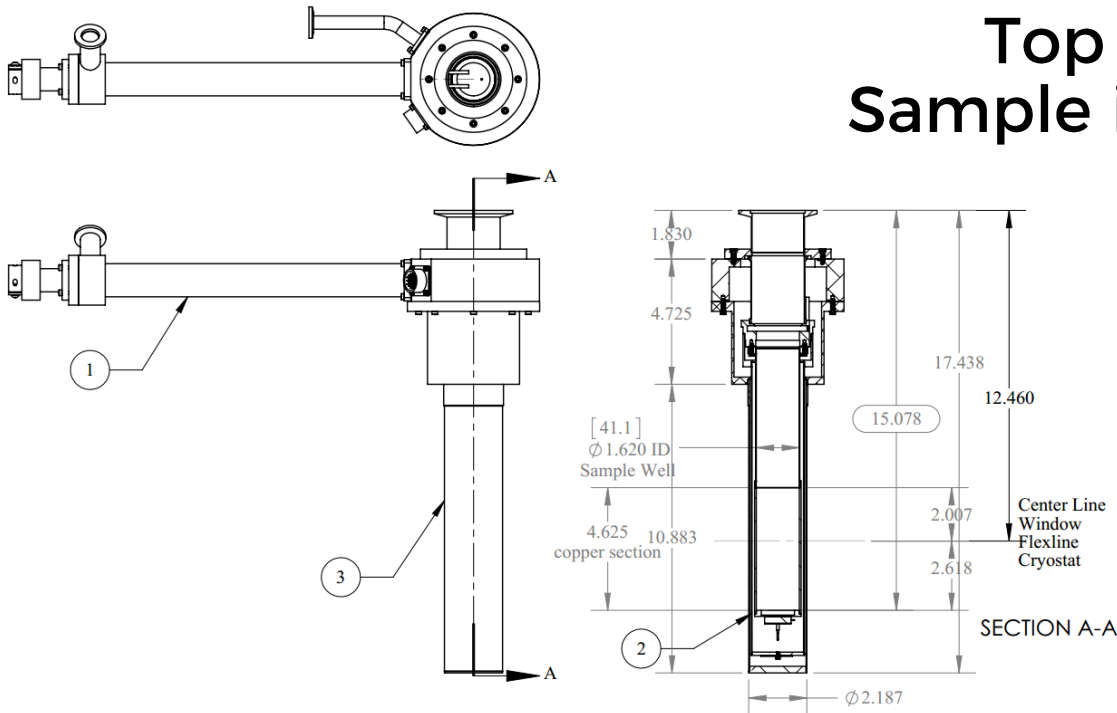


## Table-Mounted Top Loader



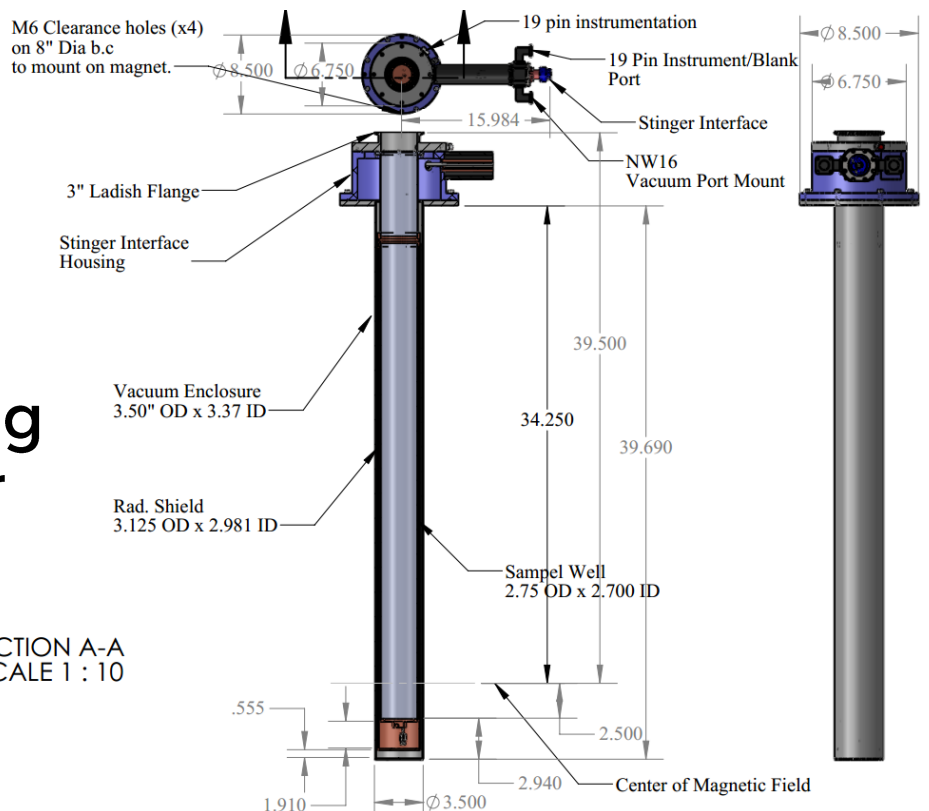
# Sample Stinger Cryostats

## Top Loading Sample in Vapor



## NMR Top Loading Sample in Vapor

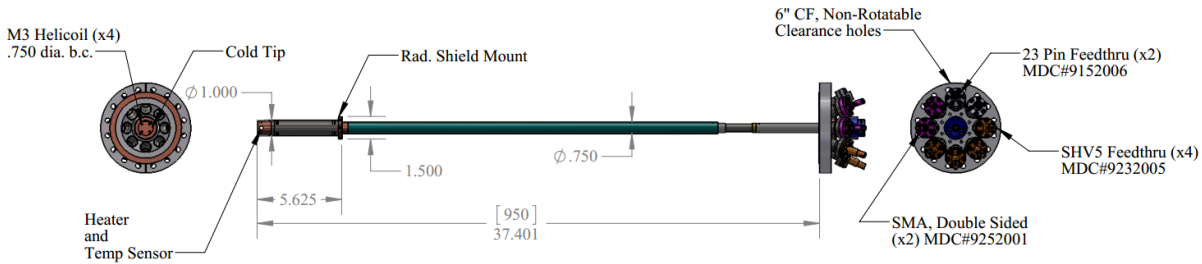
SECTION A-A  
SCALE 1 : 10





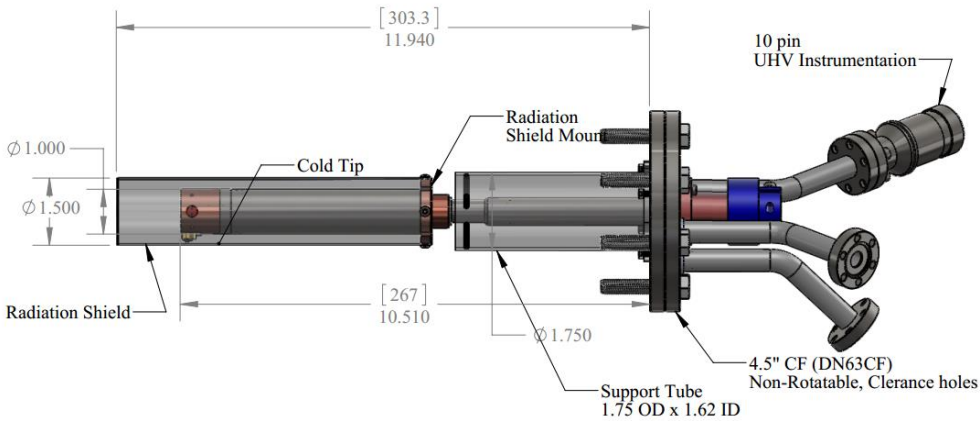
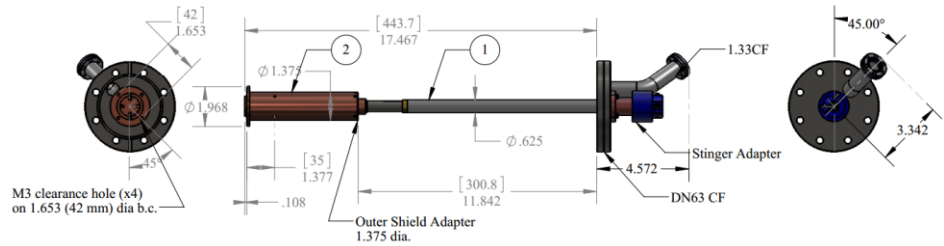
# Sample Stinger Cryostats

## Custom Ultra High Vacuum (UHV)

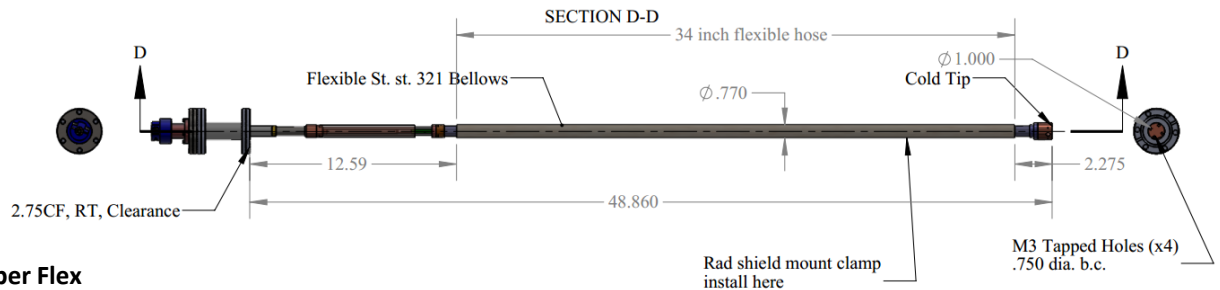


**BNL UHV**

**Diamond UHV ARPES**



**Southampton UHV Stiffened**

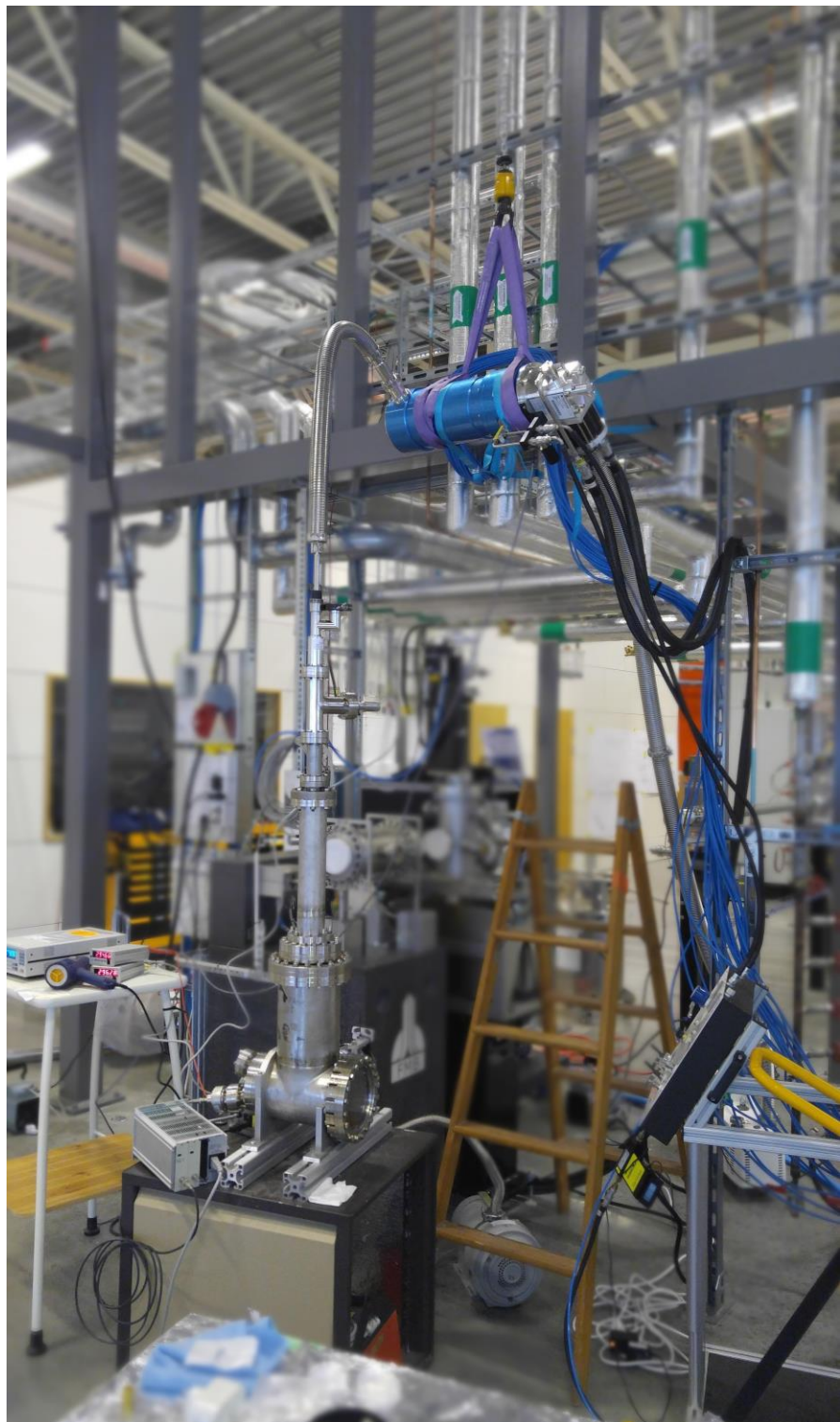


**UHV In Chamber Flex**

Note:  
Radiation shield mount is not shown

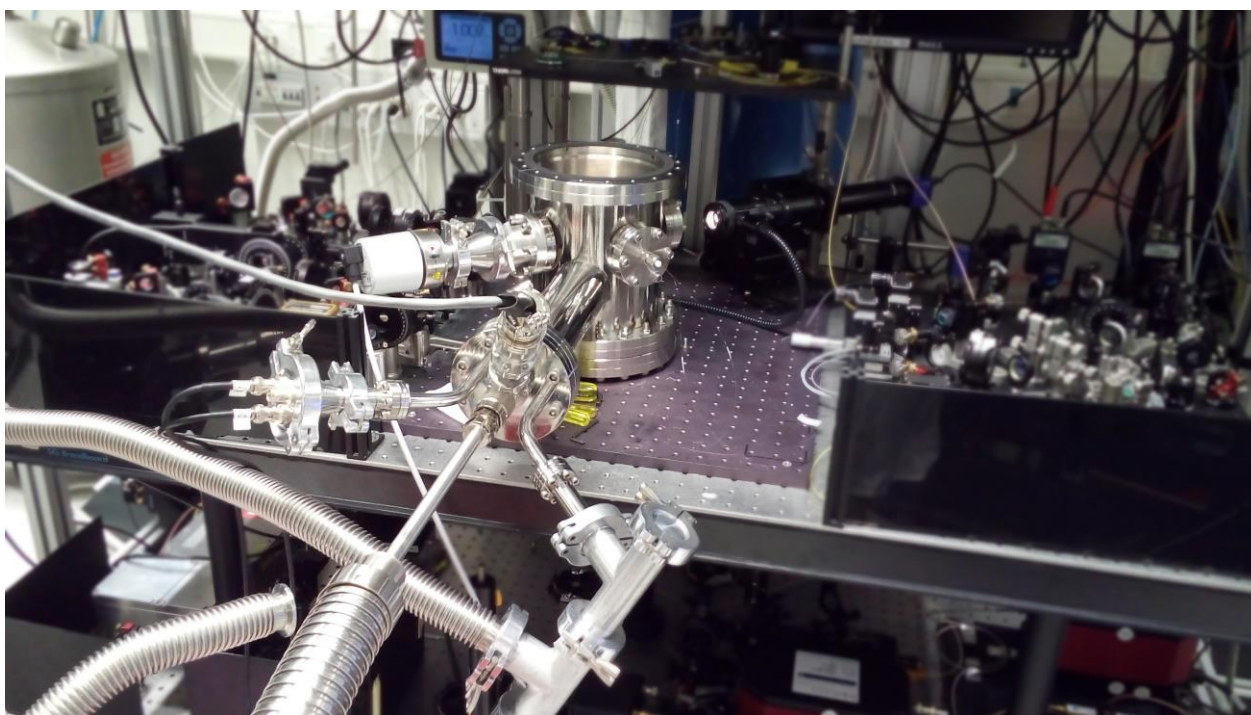
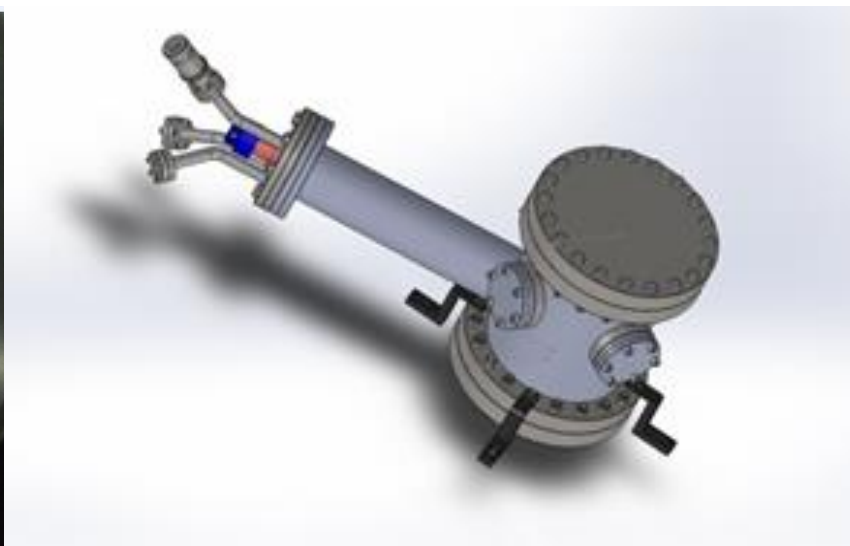
# Sample Stinger Cryostats

MaxLabs ARPES



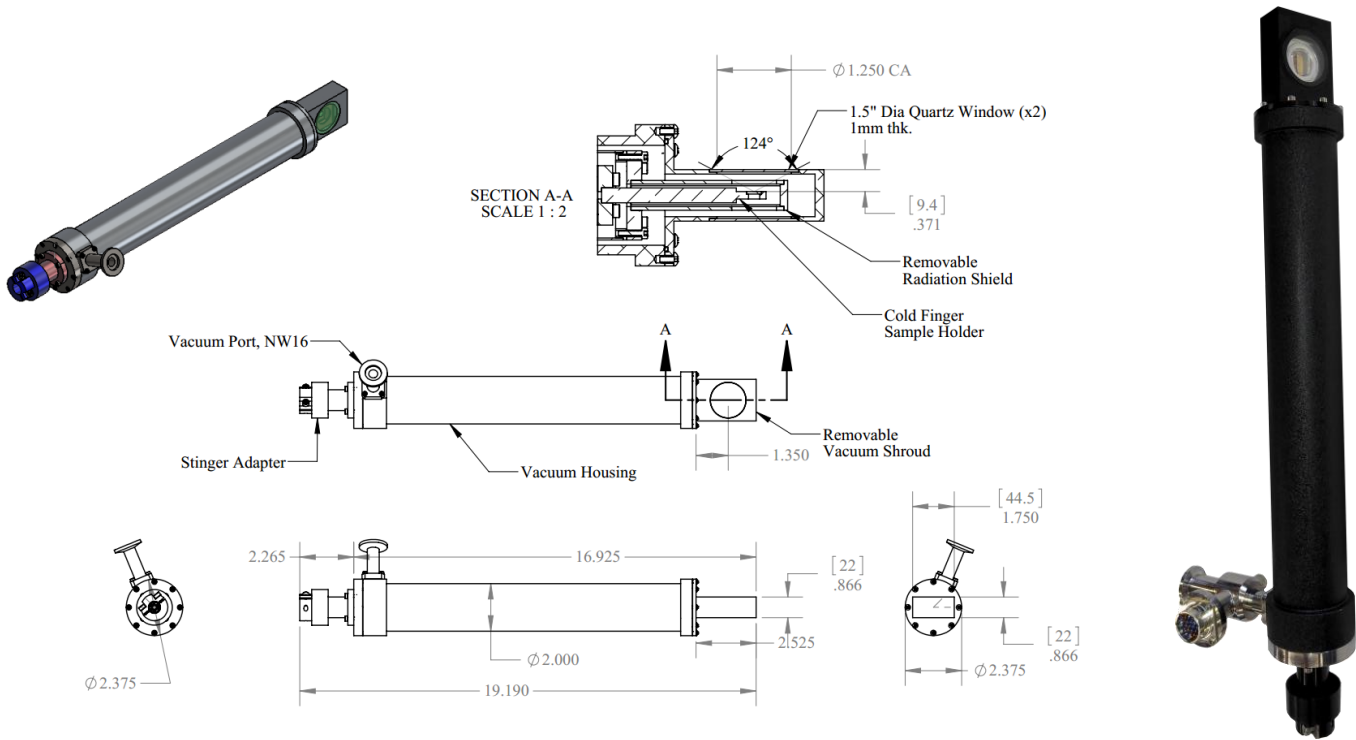
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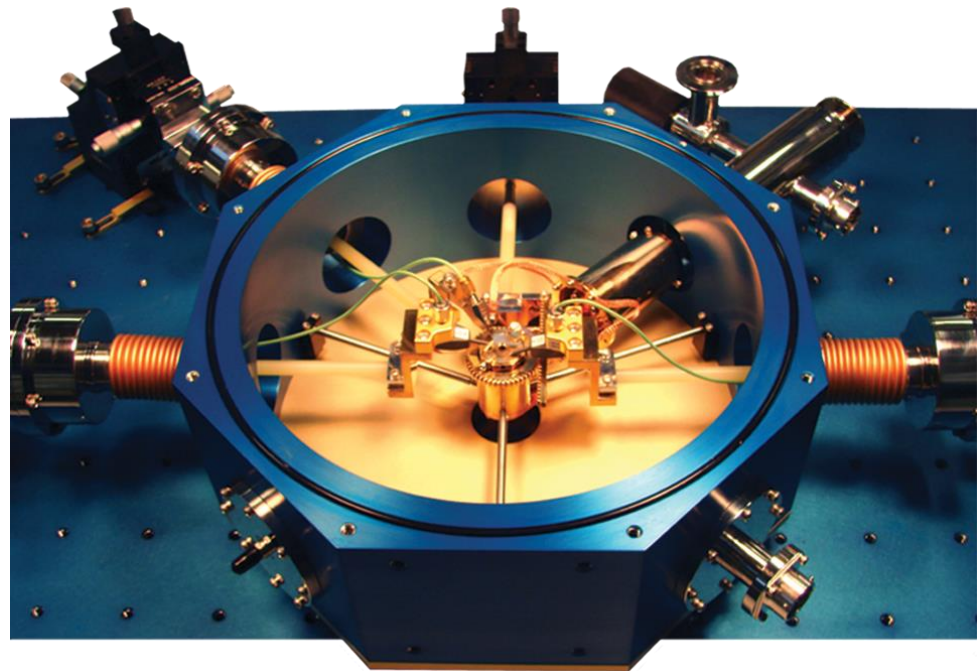
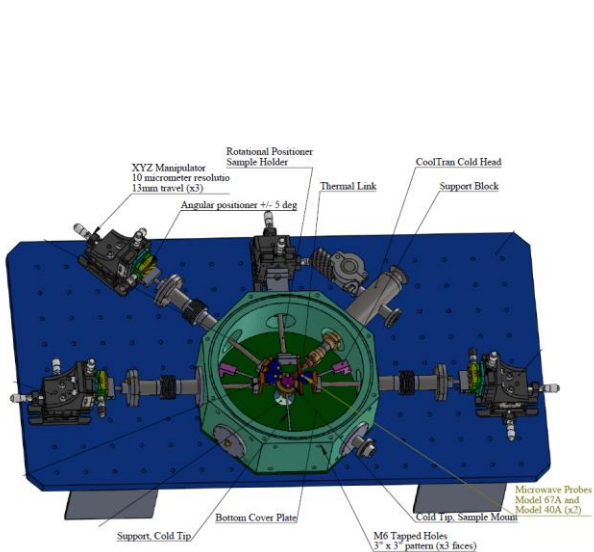


# Sample Stinger Cryostats

## 4.2K Leica Narrow Gap Optical Microscope



## Stinger Probe Station



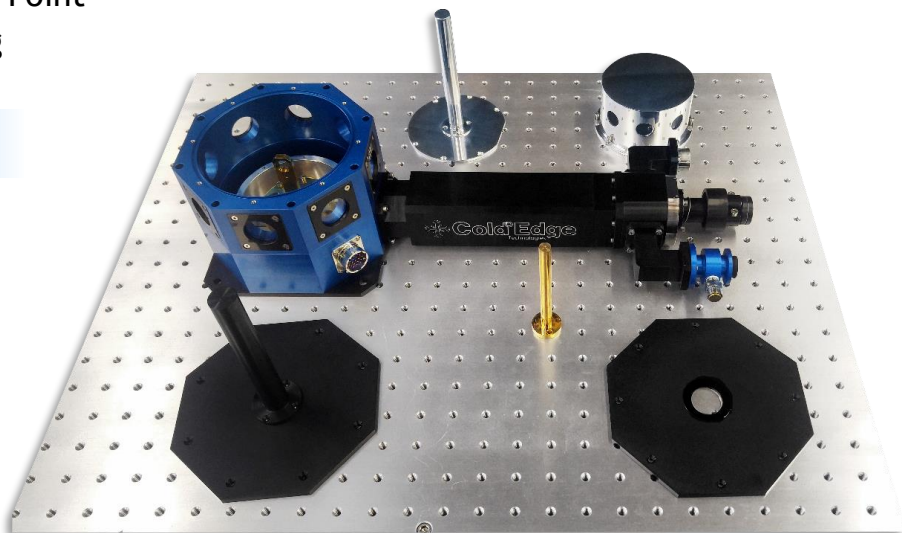


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## Existing Flow Cryostats

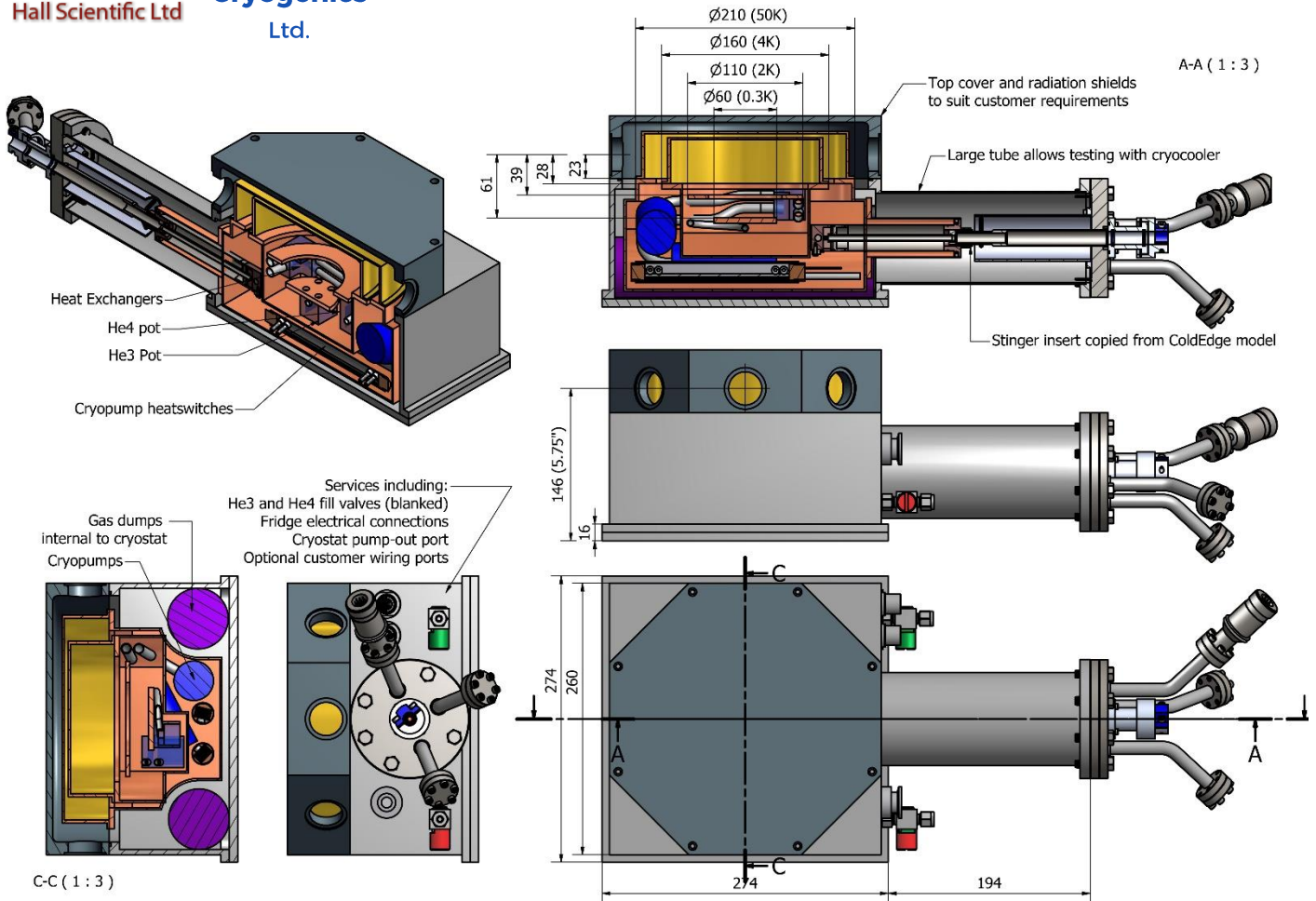
Model	Stinger™ 4K	Stinger™ 10K
ESR900	<6K	<14K
CF935	<4.9K	<11K
Optical	3.8K	9K
Microscope	3.8K	9K
NMR	7K	<16K
ColdEdge CoolTran Flow Cryostats	<3.8K	<8K



In Conjunction With

Product Available June 2019

**HSL** Compact  
Hall Scientific Ltd Cryogenics Ltd.



<b>Precooling</b>	4K Stinger
<b>Cooling Stage 1</b>	3W @ 50K
<b>Cooling Stage 2</b>	0.1W @ 4.2K
<b>Cooling Stage 3</b>	>100 microWatts @ 2K (He4 stage surplus cooling power)
<b>Cooling Stage 4</b>	~25 microWatts @ 0.3K for 24 hour hold time. (Hold time reduces with additional heat load. Base temperature 280mK typical.)
<b>Hold Time at Base Temperature</b>	24 hours typical. 3 hours recondensation cycle between shots