Optical Multi-Function Probe (OMFP)
(V725, D725, P725)

The newly designed Optical Multi-Function Probe (OMFP) offers unprecedented flexibility and versatility that allows you to conduct photonic, quantum optics and correlative microscopy experiments within the variable temperature and magnetic field environments of the PPMS®, DynaCool™ and VersaLab™. The OMFP features a room temperature "head" with multiple access ports and integrated optical breadboard for mounting optical components such as spherical and achromatic lenses, turning mirrors, filters, diffusers, beam splitters, prisms, waveplates, fiber bundles and electrical wiring. The open modular design of the probe head provides easy access to the axial ports and connectors which can be configured to route electrical, single fibers, fiber bundles and miniature waveguides to the sample space. In addition, a central optical access port allows free-beam optics experiments in the cryostat. A 0.5 in. standard optical thread mount makes aligning and focusing lens assemblies fast and easy.

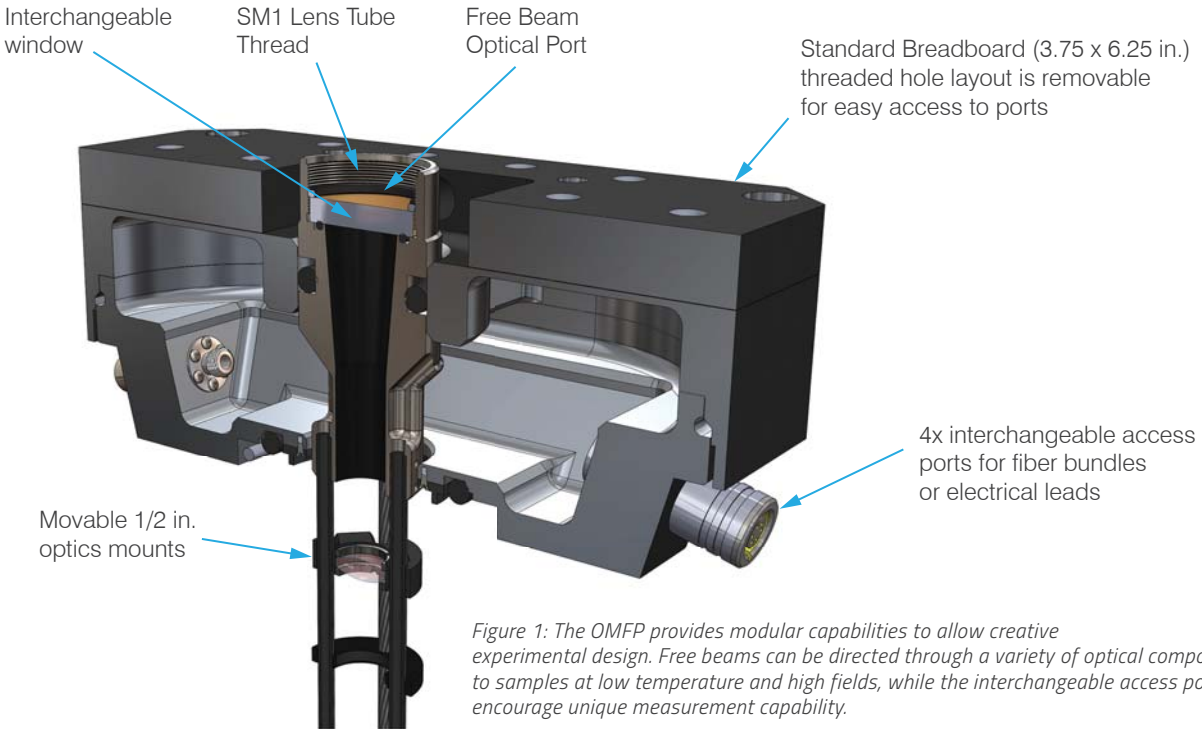

Figure 1: The OMFP provides modular capabilities to allow creative experimental design. Free beams can be directed through a variety of optical components to samples at low temperature and high fields, while the interchangeable access ports encourage unique measurement capability.

Figure 2: View showing the wired access port (cover removed) and interchangeable adapters for electrical or optical applications.

Figure 3: Combining the OMFP with the VersaLab Optix provides an experimental environment conducive to an entire new set of optical experiments at low temperatures and high fields.

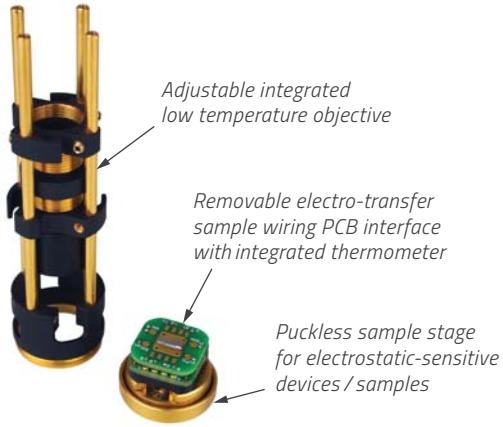

Figure 4: Modular probe cages and sample stages:

Sample stage with puck and optional XYZ stage for focusing and sample positioning

Sample stage with puck

The OMFP features a wide range of experimental sample cages to allow maximum flexibility of excitation beam focus, emitted beam photons collection, sample stage Cartesian positioning, and physical properties monitoring. Combining electro-transport and magneto-optic measurement techniques has never been easier! An easy to attach and remove sample PCB interface allows samples to be easily mounted for electrical resistivity, Hall effect, and Van der Pauw configurations under a conventional optical microscope. Once the sample is mounted, the sample carrier can then be mounted on the OMFP cage system. Cold objective lens mounting, coupled with a motorized positioning of the sample, allows for convenient and accurate focusing of the excitation beam even on thin film samples that can be only few hundreds angstrom in thickness.

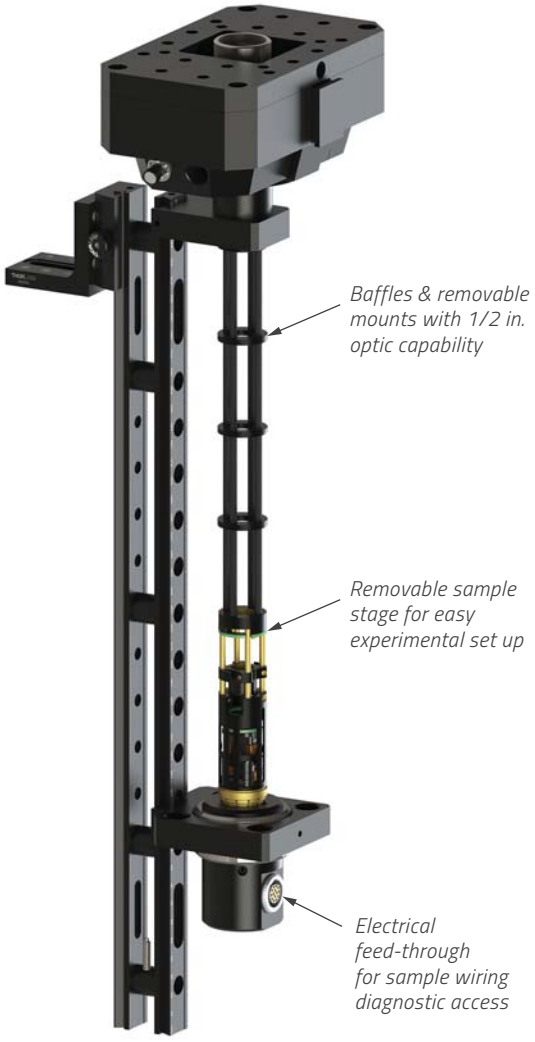

Figure 6: External optics probe stand to set up and test optical and electrical experiments.

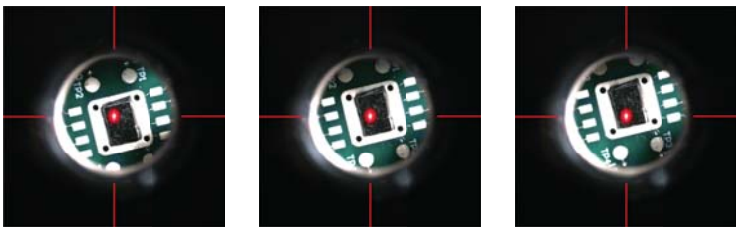

Figure 5: Photos of sample moving from XYZ positioner.

When collecting small optical signals from a sample it is of paramount importance to maximize the collection efficiency of the photons emitting from the sample in the cold environmental space. To this end, the experiment design and configurability is made easy with the OMFP mounting station. The mounting station can be used to mount and align cold objectives, collimating lenses and filters throughout the cryogenic length of the OMFP. A puck mounting electrical interface is integrated into the OMFP stand which allows for verification of electrical connection to the sample, stages and optical alignment of laser and monochromatic free space beams.

☑PPMS ☑EverCool ☑DynaCool ☑VersaLab

Features

- Available for VersaLab, DynaCool and PPMS
- 1 inch (SM1) free-beam access port and internal 1/2 inch (SM05) optical mounts along optical path
- Direct axial electrical, SMA and other ports to sample stage provided to install light pipes, fiber optics cables, and/or electrical leads
- 2 sets of 4 electrical leads on sample PCB interface for electrical transport experiments
- Multiple measurement capability (e.g., electrical resistivity, Hall effect, Van der Pauw, magnetometry and optical measurements)
- Integrated wiring for optional motorized Cartesian positioning system (3 x 3 x 3 mm movement capability)
- Sample stage with integrated thermometer
- Multi-Position filter and lens mounts for cold region of probe
- 300 K to 50 K, ± 3 T (VersaLab); 300 K to 1.8 K, ± 14 T (DynaCool); 300 K to 1.9 K, ± 16 T (PPMS)

Applications

- Free optics studies
- Fiber optics measurements
- Thermal-Optical properties
- Magneto-Optical properties

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