Low Temperature Probing Kit (PS-LOWT-KIT)

Background

A cryogenic probe station allows probing of samples at cryogenic temperatures. Unlike traditional test cryostats that require wiring to a sample and completely enclosing the sample within radiation shields, the probe station allows visualization of the sample and moveable probes to electrically interrogate multiple devices. The tradeoff to making measurements in a probe station is that the sample may be subject to heat loads due to radiation from warmer stages or due to radiation or heat conduction from the probes. Because of these heat loads, when probing a sample at base temperature, the thermal resistance between the sample and sample stage can cause the actual temperature of the sample to be much higher than the sample stage sensor. To minimize this effect:

1) The cryogenic probe station should have radiation shield(s) to minimize the radiation on the sample from stages that are warmer than the sample.
2) The probes should be thermally anchored to either the sample stage or to a stage that is capable of reaching a temperature close to the sample stage base temperature.
3) The thermal boundary between the sample and sample stage should be minimized. Refer to the section in the Lake Shore probe station user manual in Chapter 4 titled *Mounting Samples on the Sample Holder*.

The Low Temperature Probing Kit Minimizes Temperature Gradients

The items contained in the low temperature probing kit can help minimize the temperature gradient between the sample and sample stage. Figure 1 shows the installation of the kit in the probe station. The clamps provided are for a standard 10 mm × 10 mm × 0.5 mm sample on the SH-1.25-G sample holder. This clamp arrangement may not be compatible with your particular sample configuration, but it can be used as an example to construct clamps specific to your application. The kit also contains probe arm shields (6x) and spring washers (10x) for installation of these shields on the probe arms. The probe arm shields provide additional radiation shielding to the sample.

Installation

The probe arm shield should be installed on the probe mount with the spring washer providing tension. Place the probe arm shield and spring washer on the probe mount as shown below and install the probe mount firmly onto the probe arm while tightening the set screws that secure the probe mount to the arm.

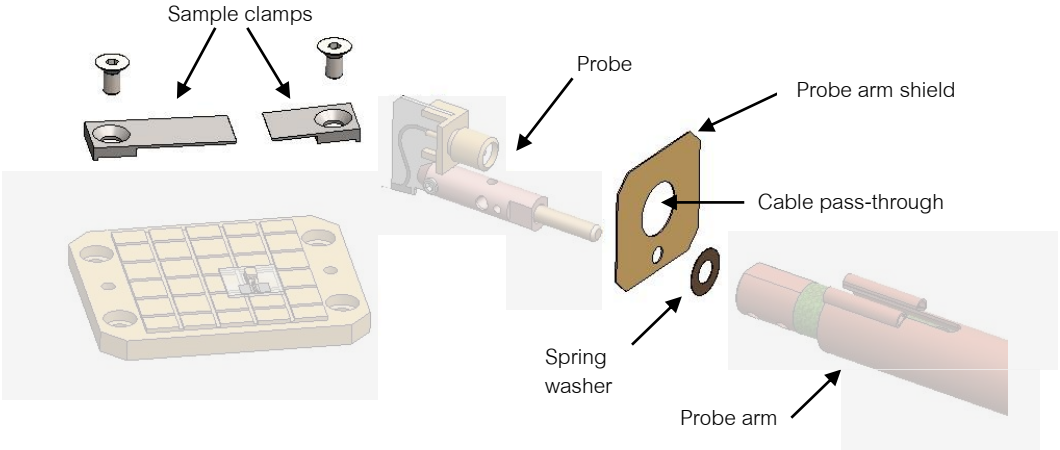

Figure 1: *Installation of the low temperature probing kit. Kit contains qty 1 of each clamp shown with mounting screws and qty 6 of the probe arm shield and spring washer. Other items shown in Figure sold separately.*