

Magnetic - Optical Applications	App-004
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The Cryostation may be configured in several ways for magnetic experiments. The sample housing may be used as is, or it may be modified to permit close proximity from the sample to the magnetic poles.

One approach is to insert the magnetic poles through the existing window ports to be very close to sample area. Montana Instruments offers an option to the Cryostation that provides this feature. Figure 1 below shows this approach. Two poles may be used in the manner, which allows optical access from above, from the other windows 90 degrees to the poles, or through optional bores through the pole centers. The pole inserts fit to the window ports and preserve the vacuum in the chamber. Different pole spacings and field concentrations can be achieved by using interchangeable pole pieces.

See the data sheet on the Magneto-Optic for more details on this.

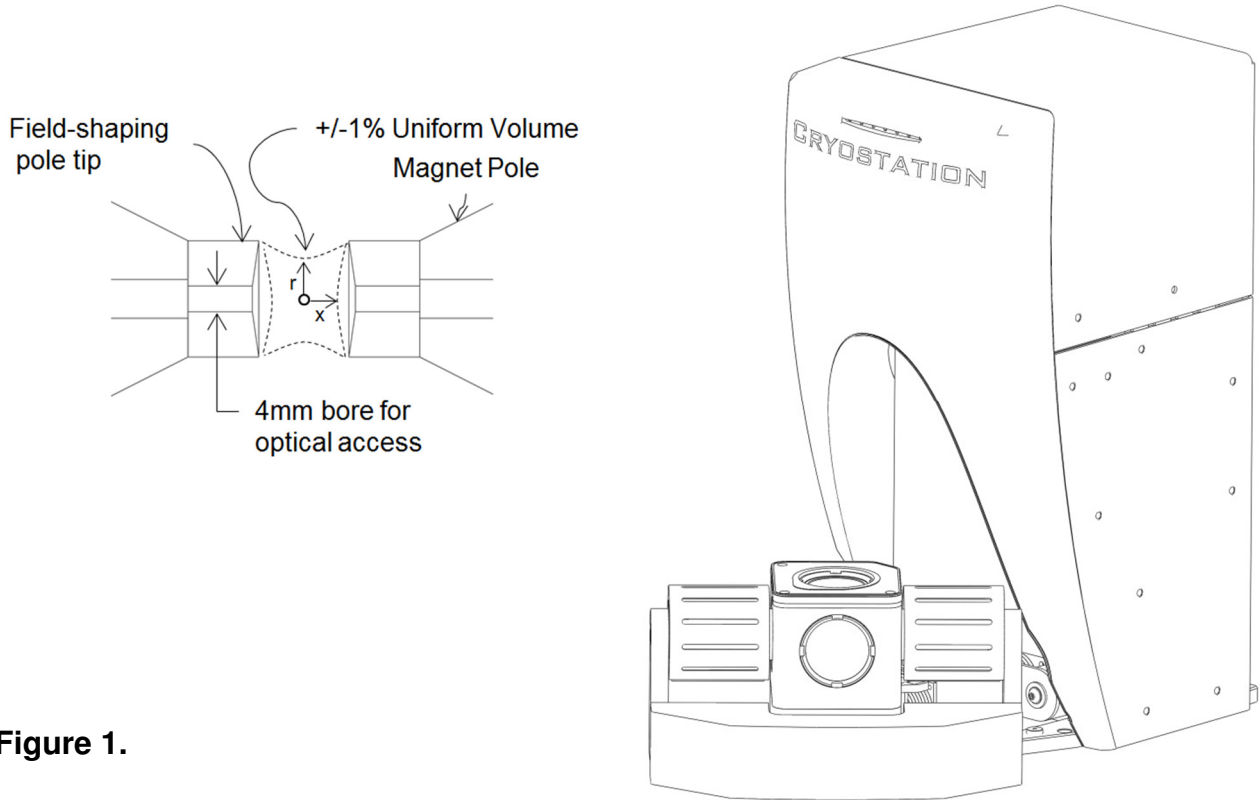


Figure 1.

These images show the approximate dimensions of the pole piece pairs.

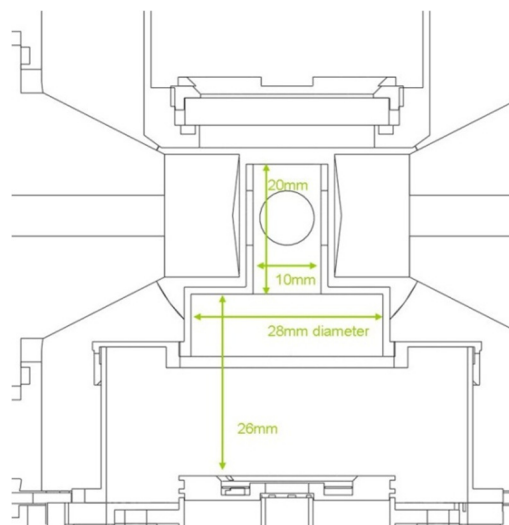
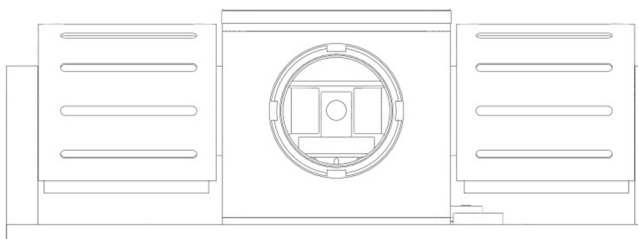


Figure 2.

This is based on the standard Cryostation, with all its stability, and added a high magnetic field with incredible optical access and experiment flexibility. Optical access through the poles, high NA access from the sides, and low working distance access from the top make demanding magneto-optic applications simple to setup. Nano-positioning of the sample inside the magnetic field makes this an even more powerful product! Here are a few features of this new product...

- Use exchangeable pole tips for even higher fields, or for specific field requirements.
- Integrated lens holder supports a small lens near the sample
- Thin radiation windows between the sample and the poles keep the sample below 4 Kelvin
- Easily remove magnets and window housing for great sample access during setup
- Electromagnet may also be used as an independent stand-alone unit for room temperature measurements separate from the Cryostation
- Active magnet cooling system is included, with temperature control and safety interlocks
- Use with unipolar or bipolar power supplies

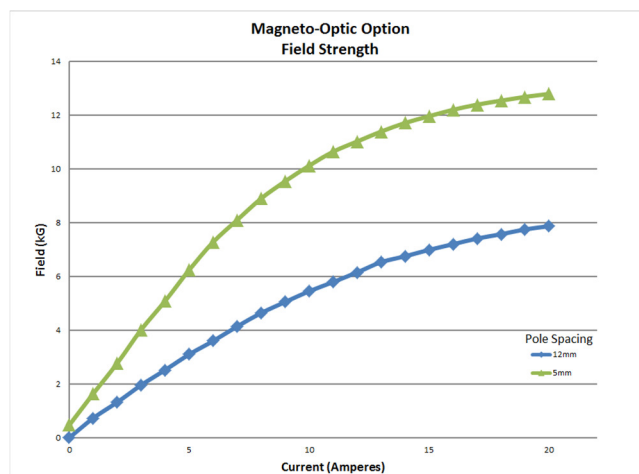


Figure 3. Map of magnetic field strength

Another approach for stronger fields is to use a large external superconducting magnet. The user sample space on the Cryostation is moved out away from the body of the unit, and the window sections are replaced with a tall castle design, as shown in Figure 4. The electromagnet is lowered over the sample castle to generate fields as large as 9T.

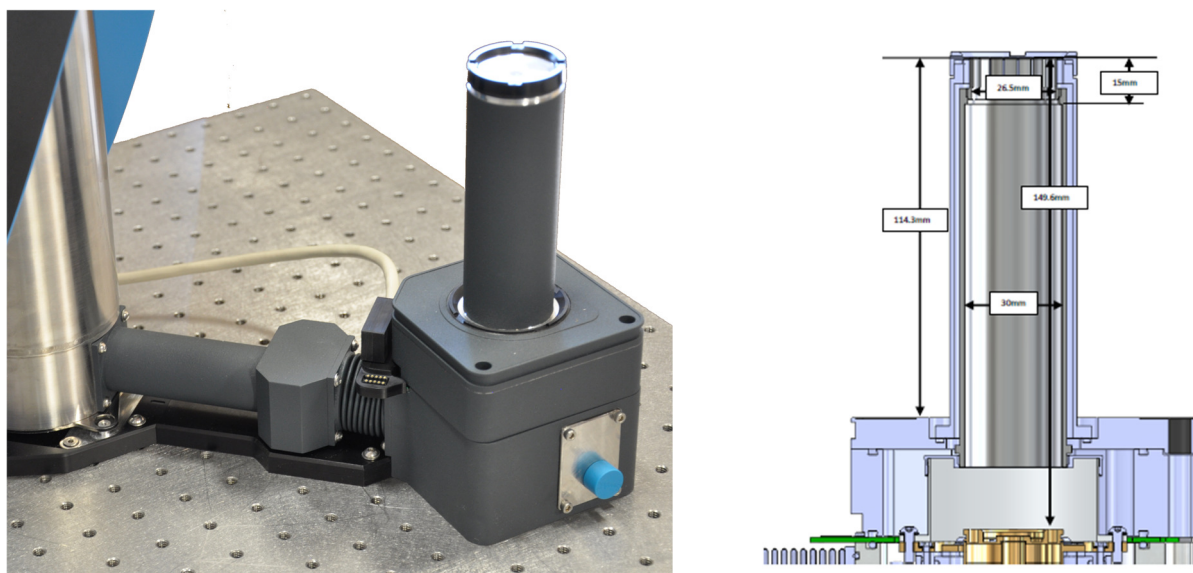


Figure 4. Castle on Extended Sample Chamber Option

The sample chamber has been designed with non-ferric materials, so any field introduced is not disturbed by the enclosure. For example, the body is aluminum, and screws in the assembly are stainless steel.

Due to the simplicity of the sample housing, it is possible to create a custom housing that allows unique optical or magnetic access to the sample. For example, it is possible to replace the window assembly level with a design which is thinner and allows either windows or room temperature magnets to be located within a few mm of the sample on each side. This would have a very high numerical aperture on both windows simultaneously with the sample located at the center.

If you have special access or interface needs, please contact our application engineers. We are interested in supporting these projects.