



## PORTABLE / LAB RUBY PRESSURE MEASUREMENT SYSTEM

### Model LRS-NAV12UZ-22

The portable ruby pressure measurement system is designed for online Ruby fluorescence pressure measurement in various Diamond Anvil Cells in the pressure range from ambient to sub-megabar at various temperatures (from cryogenic to 700K). The system can be provided in a custom configuration tailored for a particular application / experimental requirements. The system can be provided with a laser enclosure, a mounting stand and X-Y-Z manual sample stage, effectively turning the Portable system into an advanced Laboratory system with 12X zoom capability.

### Specifications of the Portable / Lab Ruby pressure measurement system

◆ The Portable (online) Ruby system is based on Navitar 12X Motorized Ultra-zoom infinity corrected microscope, DPSS 532nm laser with adjustable intensity and >300 mW of maximum power, and fiber coupled Ocean Optics spectrometer (typically HR2000+ or high-sensitivity low background Peltier-cooled Ocean Optics QE-Pro spectrometer for more demanding applications).

◆ The Ruby signal is delivered to the Ocean Optics spectrometer via a multi-mode optical fiber. DACTools typically provides 105  $\mu\text{m}$  and 200  $\mu\text{m}$  diameter patch optical fibers. They can be easily replaced by fibers with other diameters for better throughput / resolution.

◆ The custom DAC Tools software for measuring / automatic fitting and tracking / recording the Ruby spectrum is provided with the system. We also offer a Windows PC all-in-one computer or a laptop with preinstalled software for sample observation (through Flir digital camera) and Ruby spectra processing software.

◆ The system is infinity corrected. It is supplied either with Mitutoyo LWD 5X objective or Mitutoyo compact objectives with working distance of  $\sim 70$  mm (2X) OR  $\sim 60$  mm (3X). The working distance of the system can be easily extended to 100-200 mm using achromatic lenses.

◆ The zoom ratio is controlled with a dedicated DAC Tools Zoom controller through by DAC Tools computer software (an additional manual zoom control is optional). With 5X Mitutoyo objective the vertical field of view on the monitors ranges from  $\sim 180$   $\mu\text{m}$  to  $\sim 2.0$  mm.

◆ In standard configuration the system is equipped with Flir Chameleon-3 3.2 MP digital camera with DAC Tools camera software. The digital camera can be replaced with HR analog video camera.

◆ The system can be provided with an optional “docking station” so it can be used as a compact laboratory system when not needed online.

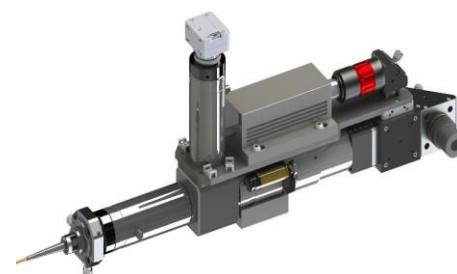


Figure 1. Portable Navitar 12X Ultrazoom Ruby system in 90 degrees configuration.

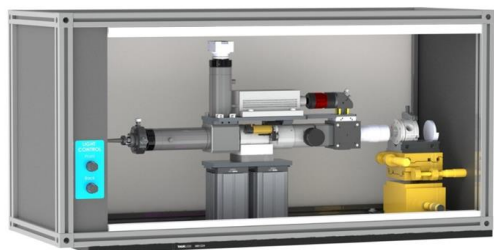


Figure 2. Ruby system with laser protective enclosure (doors not shown) and manual translation stages.

◆ Lab version of the system is provided with the XYZ sample positioning stage stack and sample / DAC holder. The stack is based on Newport high precision manual stages. The system support is designed to accommodate the height and position of the bare “Standard Symmetric” or other DAC and can be easily customized. The manual XYZ stack can be replaced with a motorized version.

◆ The Lab version of the system is provided with 12” x 30” (30 x 90 cm) or comparable mounting breadboard with cover / protective enclosure ( $\sim 12$ ” x 32” x 16” = 31 x 81 x 41 cm).

# STATIONARY / LAB RUBY PRESSURE MEASUREMENT SYSTEM

## Model LRS-175(/200)-22

The Lab ruby pressure measurement system is designed for offline Ruby fluorescence pressure measurement in various Diamond Anvil Cells in the pressure range from ambient to submegabar. It is a fixed magnification system with typical magnification of 5X-10X. Depending on specific demand, the system can be provided in a custom configuration, and various elements can be replaced / upgraded both before ordering and after delivery with special arrangement.

### Specifications of the Lab Ruby pressure measurement system

💎 The Ruby system is powered by green Lasermate DPSS 532 nm laser with adjustable intensity and >300 mW maximum power. The ruby spectra are collected with Ocean Optics HR2000+ spectrometer, which can be upgraded with thermoelectrically cooled QEpro spectrometer for more demanding applications.

💎 The Ruby signal is delivered to the Ocean Optics spectrometer via a multi-mode optical fiber. DACTOOLS will provide 105  $\mu\text{m}$  and 200  $\mu\text{m}$  patch optical fibers. They can easily be replaced by fibers with different diameter for better throughput / resolution.

💎 The spectrometer is controlled by a custom open access DACTools software with automatic ruby spectrum fitting and pressure tracking function. The software allows using the system in time-resolved mode with burst data collection at a rate up to 200 spectra per second.

💎 The system is infinity corrected. It is typically supplied with 10x Mitutoyo objective lens with  $\sim 33.5$  mm working distance. The objective can be replaced with other objective lenses if higher / lower magnification is required.

💎 The system frame is modular and is based on Thorlabs (as well as custom) opto-mechanical parts. Thus the system can be relatively easily modified/upgraded should the need arise.

💎 The XYZ sample positioning stage stack and sample / DAC holder are provided. The stack is typically based on Newport high precision manual stages. Motorizes stages can be provided on demand. The microscope support will be custom designed to accommodate the height and position of the typical sample / DAC.

💎 The illumination system consists of two LED illuminators – built in coaxial for reflected light and behind-the-sample flexibly mounted LED for transmitted light.

💎 The system is typically provided with 12"x24" (300x600 mm) or comparable mounting breadboard with cover/protective enclosure.

💎 The system comes in several parts and requires some minor assembly in the lab.

