

# EXtreme PREcision Spectrometer (EXPRES)

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[DeVeny Optical Spectrograph](#)

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## At the Telescope

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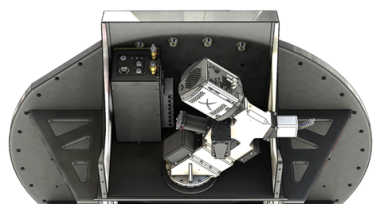
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The EXPRES front-end module mounted on the DCT Cassegrain instrument cube. The FEM electronics are mounted within the instrument port cavity as seen in the upper left corner.

**Visitor Instrument – Available Full-Time, Remote Available – CONTACT D. FISCHER IF YOU WISH TO USE**

**Mounting Port:** Instrument Cube – Port B (small)

**Manual:** Contact D. Fischer for the current manual

#### **Additional Information:**

- [EXPRES Webpage \(Yale\)](#)
- An overview of the instrument can be found in [Jurgenson et al. 2016, Proc SPIE, 9908, 99086T](#)
- Blackman, Ryan T., et al., 2020, AJ, 159, 238, [Performance Verification of the EXtreme PREcision Spectrograph](#)
- Petersburg, Ryan R., et al., 2020, AJ, 159, 187, [An Extreme-precision Radial-velocity Pipeline: First Radial Velocities from EXPRES](#)

**Instrument Scientist:** Debra Fischer (debra.fischer at yale dot edu)



The EXPRES spectrograph structure. The outer vacuum enclosure maintains the spectrograph in a vacuum at better than 0.01 mBar, and using radiation shields and insulation maintains the temperature to better than 1 mK. The optics support structure visible inside the chamber maintains precise alignment of the optics and is mounted on a suspension to isolate it from mechanical vibrations. Removable panels allow easy access to the spectrograph for maintenance.

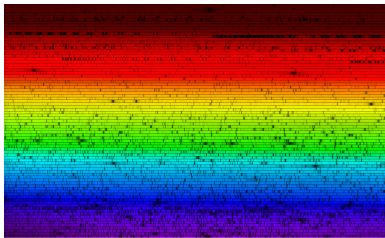
The EXtreme PREcision Spectrometer (EXPRES) has been built by Debra Fischer's group at Yale. It consists of a front end module (FEM) mounted on the instrument cube for sending star light down a fiber to the larger environmentally controlled Back End Module (BEM) that contains a high resolution spectrometer. The goal is 10 cm/sec precision for radial velocity measurements. The FEM arrived at LDT for testing beginning in late 2017Q2. The BEM is located in the ground floor instrument lab and was installed in late 2017Q4 with commissioning following during 2018A. At this time, EXPRES is fully operational. So that the partnership can begin to learn about the capabilities of EXPRES, anyone interested in using EXPRES should contact the EXPRES PI to discuss what they hope to do, and what can be supported.

Tutorials:

- For the video tutorials, confluence playback is functional but limited. You may want to download the file and use your favorite video display tool. These have been tested with VLC and QuickTime.
- [EXPRES observing script tutorial](#). (mp4 container w/ h.264 video and AAC audio)

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#### Instrument Quick Facts:



The white pupil design has three resolution modes:  $R = 30000$ ,  $45000$ ,  $60000$  and we obtained the first light solar spectrum (5-second exposure) by running an optical fiber down the hall and holding it out the window! The image above shows the extracted 2-d spectrum and the plot on the one below shows the sodium doublet in all 3 resolution modes.

