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TripleSpec 4.1

Updated April 24, 2019 with updated SV call (scroll down) and results of April run

Introduction

This is the home page for the TripleSpec infrared spectrometer on SOAR. The instrument was previously used on the Blanco telescope, under the acronym ARCoIRIS. It is the fourth of a series of similar instruments, and was built under contract to NOAO by Cornell University (Terry Herter, PI) and collaborators. The same team was contracted to perform the internal modifications required to adapt the instrument for operation at SOAR (f/16, vs. f/8 on Blanco).

For the time being, use [this link](#)^[1] to access technical and performance information for use in writing proposals. We will migrate and/or replace information as commissioning of the instrument proceeds. Known differences are summarized below.

TSpec is mounted on SOAR on the IR Nasmyth platform, replacing the OSIRIS spectrograph on one of the side ports. The instrument is fed by a dichroic, which allows visible light to go to the facility guider. The guider is able to patrol the full field of view, including the spectrograph target. So long as there is a suitable guide star in the field of view, this provides faster guiding than the TSpec slit viewer, and therefore better image correction. The slit viewer will still be usable in fields where there are no visible guide stars.

Differences from Blanco

Guiding

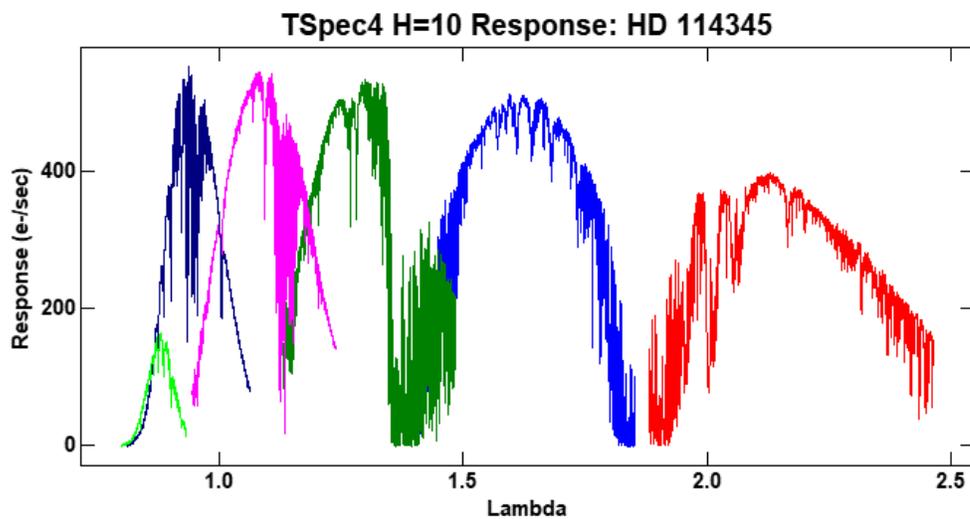
On SOAR, the regular optical guider can be used; it is preferred as it has a faster response and allows tip-tilt correction using the tertiary mirror. It is capable of doing precise offsets, but does not currently support non-sidereal guiding (as this requires continuously moving the guide probe during the

observation). Note that the guider is behind a dichroic and therefore can be used on-axis (i.e., you can guide on your target if its brightness is suitable).

Short Wavelength Cut-Off

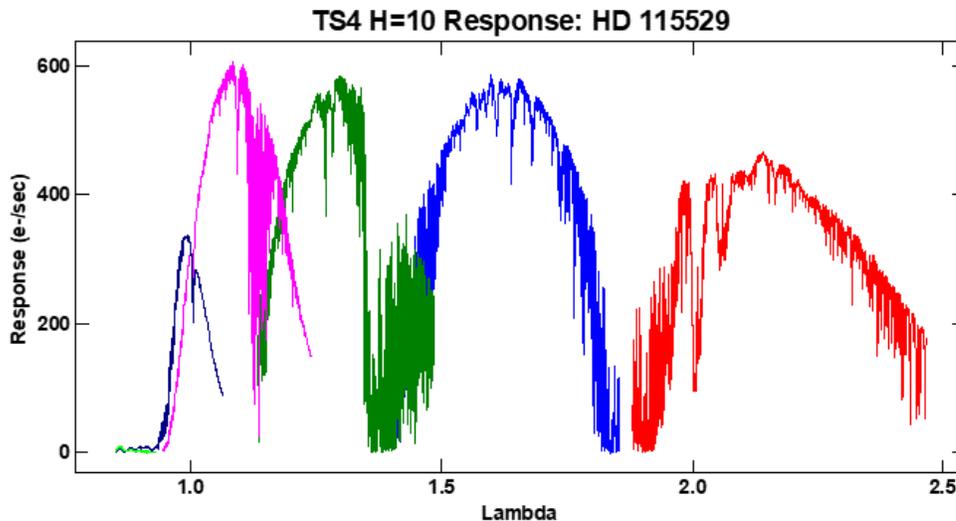
TSpec is fed by a reflection off a dichroic, which also transmits light to the guider. As a result, the response cuts off below 1.0 microns. Compare the response on Blanco (top) with the response on SOAR (bottom). The nominal point of 50% reflectivity of the dichroic is around 0.95 microns.

Blanco A-Star Response: HD 114345 A0V



- HD 114345 is A0V C star, V = 7.77, J = 7.525, H = 7.542, K = 7.498
- To get response used Gain = 1.1 e-DN, t = 10 sec and mag = 7.5 => divide total counts by 90.91 to get response. Files: sp_0039, 0040.

SOAR A-Star Response: HD 115529 A0V



- HD 119434 is A0V C star, V = 6.173, J = 6.098, H = 6.116, K = 6.091
- To get response used Gain = 1.1 e-DN, t = 10 sec and mag = 6.116 => divide total counts by 325.2 to get response. Files: SPEC_OBJ0204.

TS4 on SOAR

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Figure 1 - Comparison of TSpec response on Blanco and SOAR telescopes. Note the reduced response on SOAR shortward of 1.0 micron. Above this wavelength, the SOAR response is comparable (possibly better).

Commissioning and Science Verification (Updated)

We expect performance on SOAR to be similar to that on the Blanco (hopefully, somewhat better), so we are allowing proposals for the instrument for semester 2019B. Proposers should use the technical information from the CTIO website (linked above). Any time granted in this fashion is considered "shared risk", but we would not be offering it if there were serious doubts about performance.

Installation and initial testing took place during a mid-March engineering run. We received several proposals for science verifications, some of which we were able to complete or start during the April engineering run. We also performed additional engineering work.

We are still accepting proposals for science verification for June - the Call for Proposals for science verification is [here](#) [2].

People who are interesting in helping with science verification should [contact one of the undersigned](#) [3]. Preference for science verification will be given to proposals that can produce a useful science result with a few hours or less of data. Proposers who have successfully used the instrument on Blanco are particularly welcome.

April Update

The principal tasks for the April run were (a) improving the optical alignment of the instrument to the telescope and (b) determining the need to make internal adjustments to the instrument's alignment.

We were able to set the match the focus of the telescope in the instrument to the middle of the range for the facility guider, which simplifies guide star acquisition and guiding in general. The pupil alignment (primary on cold stop) was good to start with; there is still some room for improvement but any gains in throughput or reduction in background should be modest at best.

We did, however, determine that the slit viewer is not quite in focus on the spectrograph slit, and that the slit is not quite in focus on the spectrograph detector. The differences are modest, but corrections are desirable for optimal performance. We carried out the science verification observations by adjusting the telescope focus for minimal slit losses. The effort to correct the detector positions will occur between now and the June engineering/SV run.

We will be posting updates between now and the June run.

Below, a few photos from the installation -

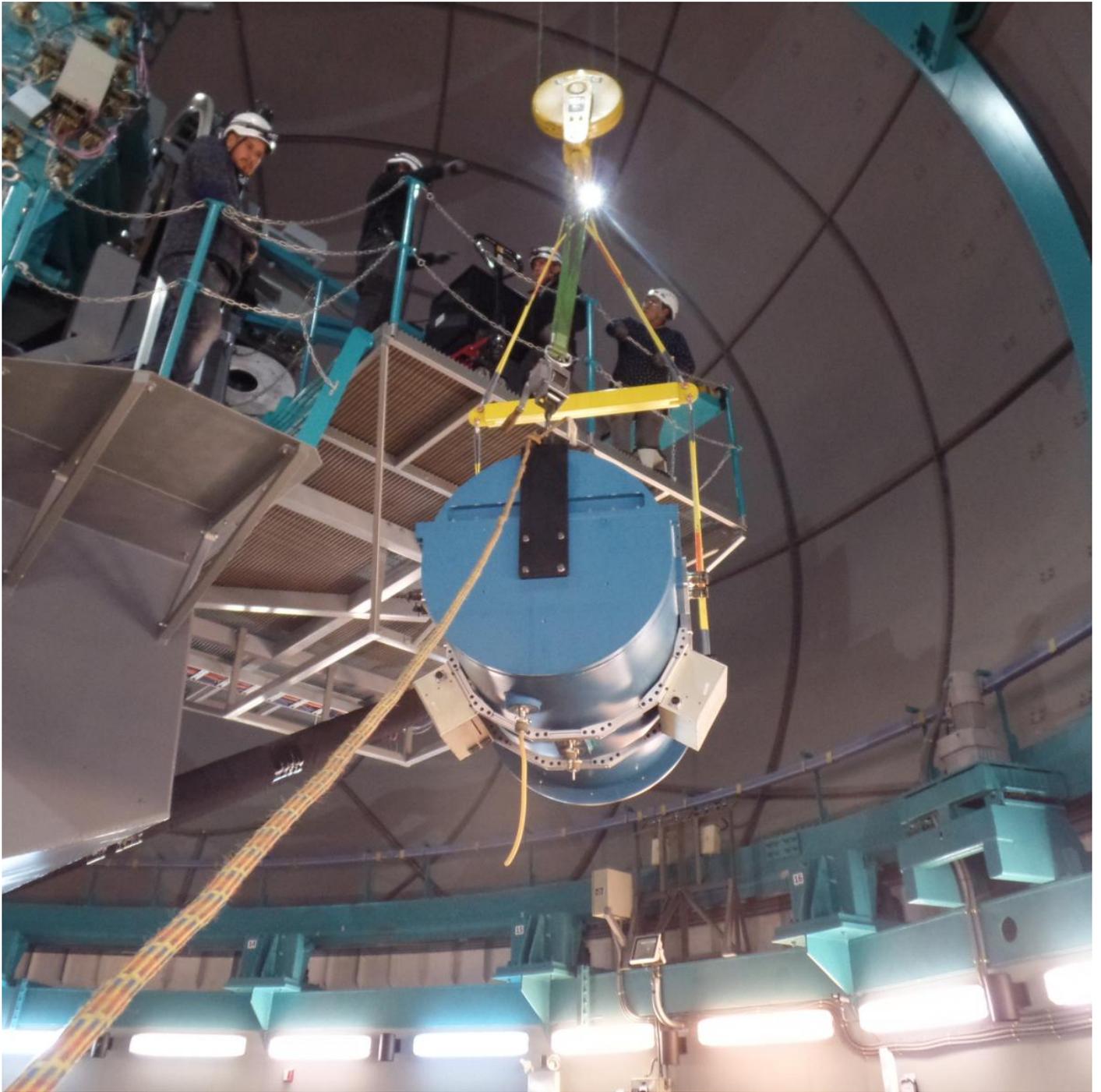


Figure 2 - TSpec being lifted to Nasmyth platform



Figure 3 - Installed on Nasmyth, prior to installation of electronics boxes

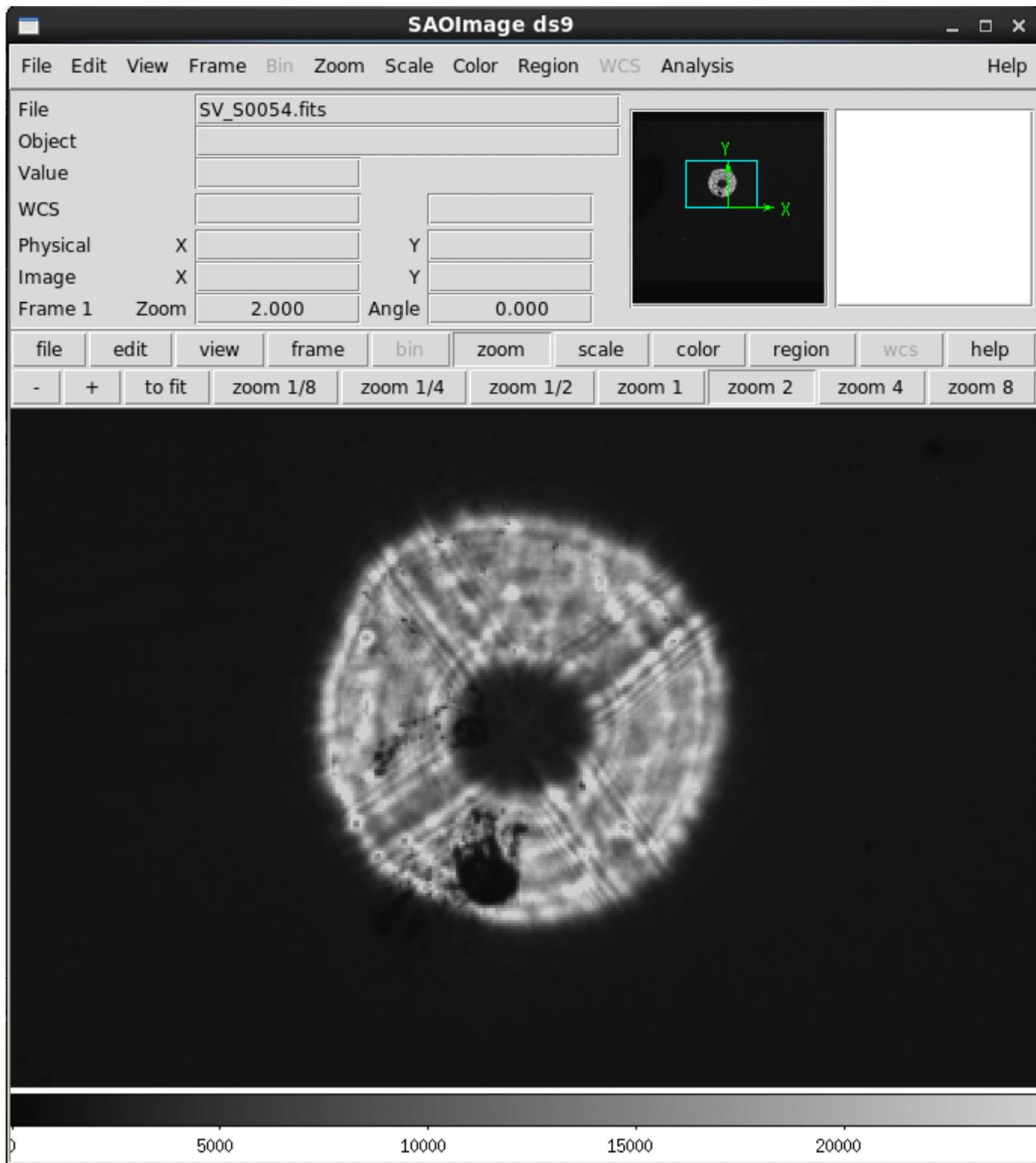


Figure 4 - First light! Quick check of pupil alignment, done by defocusing a bright star.

- Jay Elias & Sean Points

Source URL: <http://www.ctio.noao.edu/soar/content/triplespec-41>

Links

[1] <http://www.ctio.noao.edu/noao/content/Arcoiris>

[2] <http://www.ctio.noao.edu/soar/content/triplespec-41-science-verification>

[3] <http://www.ctio.noao.edu/soar/content/soar-staff>