Instrument-specific FAQ (ESPRESSO) (Phase 2)

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Frequently Asked Questions related to ESPRESSO

- **How can I choose between the singleHR and singleUHR modes?**

Answer: The median measured resolving power of the singleHR mode is 140,000 while for singleUHR it is 190,000. The singleUHR mode should be used if the highest ESPRESSO spectral resolution is required for your science case. However, the UHR, due to its smaller fibre, gives a lower S/N and a lower RV precision compared to the HR mode. As a result, if a high S/N or high RV precision is important for your science case and the highest spectral resolution is not needed, the singleHR mode should be preferred. Detailed calculations can be performed with the ESPRESSO ETC available at http://www.eso.org/observing/etc. The RV precision of the UHR mode is expected to be of the order of 1m/s.

- **Which of the two pixel binning modes, 1x1_FAST or 2x1_SLOW, should I use for the singleHR mode?**

Answer: Generally, the 1x1_FAST mode is used for relatively bright targets (V<10-12), while the 2x1_SLOW mode is used for fainter targets (V>10-12). Detailed calculations can be performed with the ESPRESSO ETC available via http://www.eso.org/observing/etc. High-precision RV observations may preferentially better be executed with the 1x1_FAST setting. Overheads are very similar for the two modes (the 2_1_SLOW mode reads the detector slower, but it has half the pixels).

- **Which of the options should I use for 'Source on fiber B'?**

Answer: While the complete set of options include DARK/ SKY/ THAR/ FPCS, the standard options are SKY or FPCS. The Fabry Perot calibration source (FPCS) is used for relatively bright targets and radial-velocity studies. The SKY is used for fainter targets, for which a sky subtraction is important, and for which a contamination of the FPCS light needs to be avoided. The DARK option can be chosen in case of crowded fields, where the SKY option might introduce contamination from another source in the field. With the DARK option, the entrance to Fibre B is blocked. The THAR source should normally not be used at night. It is available in case of a failure of the FPCS.

- **Which daytime calibration should I associate to Fibre A?**

Answer: The options are THAR or LFC. Since the LFC is still in an experimental phase, we recommend the user to choose the THAR option for the time being. Note that the LFC covers only the 500nm-720nm wavelength range. The pipeline will automatically use ThAr outside this range.

- **Can I use more than one observing template in an OB?**

Answer: This is possible, but normally not necessary. A typical OB consists of one acquisition template and one observing template. A second observing template could however be used to employ two different binning modes or different exposure times within the same instrument mode.

- **Which is the field of view for the ESPRESSO acquisition process?**

Answer: The FoV for acquisition is 17 arcsec. Finding charts should show a field of 30x30 arcsec.

- **As a user, do I have to care about additional calibrations that I need to request?**

Answer: The calibration plan as outlined in the ESPRESSO user manual, should be sufficient for the majority of use cases. Observers interested in highest S/N may request additional flat-field frames. The calibration plan provides flat-field frames with a SNR of about 1000.

- **Which is the constraint set for ESPRESSO and which conditions may be critical?**

Answer: The ESPRESSO constraint set includes the airmass, sky transparency, fractional lunar illumination (FLI), moon angular distance, seeing, and the precipitable water vapor. The ESPRESSO exposure time calculator (ETC) available at http://www.eso.org/observing/etc can be used to study the effects of these values on your observations.

- **Do I have to worry about precipitable water vapor (PWV) for my ESPRESSO observations?**

Answer: In the ESPRESSO wavelength range, there are three absorbing species: O_2, OH, and H_2O. Of these, water vapor is the one that affects the largest wavelength range. The effects are not as pronounced as in the (near-)IR, but can have an impact on some scientific objectives. In general, for wavelengths shorter than 700 nm, water absorption signatures can range between about 1-10%, depending on the PWV. The wavelength region of 700-800nm is strongly affected by water absorption, with numerous deep lines that can have an impact on the observations even for low PWV value. If aiming at a high spectral fidelity, you should estimate the impact of water vapor on the lines or wavelength range of interest using the ESPRESSO ETC and the SkyCalc tool available from http:/www.eso.org/observing/etc. If interested in lines in the 700-800nm region, it may be important to set a constraint on the PWV, which is a part of the ESPRESSO constraint set. More information and references are available in the ESPRESSO user manual.

- **Which is the limiting magnitude for acquisition?**

Answer: Acquisition has succeeded with sources of V mag as faint as 20 to 21 in dark sky conditions. Acquisition of targets fainter than a V mag of 18 require approval through a waiver request. Fainter targets can be acquired with a blind offset.

- **How will the quality control be done at Paranal (QC0)?**

Answer: Observations will be graded based on the constraint set. The expected S/N will also be considered for QC0. Please include in the ESPRESSO-specific OB comment field the expected S/N at a wavelength of 550 nm, as reported by the ESPRESSO ETC.

- **Can I use the *snr observing templates in service mode?**

Answer: No. These templates are not offered for service mode observations. In general, the time of all VLT SM observations is accounted with the pre-estimated execution time calculated when submitting the OB.

- **Can I observe moving targets with ESPRESSO?**

Answer: Yes, differential tracking velocities in RA/DEC can be provided as for other instruments at the VLT.

- **Can I select the telescope with which the observations will be carried out?**

Answer: No, ESPRESSO performances are not UT dependent. Your observations in the 1-UT mode will be executed on any of the Unit Telescopes as it fits the overall telescope schedule. Your run is pre-assigned to a certain UT at which it will most likely be executed. However, any OB might be re-scheduled to another UT for

operational needs.

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