Instrument-specific FAQ (XSHOOTER) (Phase 2)

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Frequently Asked Questions related to X-SHOOTER

- **I am mainly interested in the NIR arm. Can I provide a finding chart produced from a NIR image?**

Answer: In X-Shooter the acquisition is done through an optical detector. Therefore you have to provide a finding chart produced from an optical image. This can be done from p2 automatically.

- **Do I need to build my OBs such that the execution times in the three arms are identical, in order to be sure the telescope offset is applied only when all exposures are completed?**

Answer: No. The telescope offset is applied only once the **longest** exposure series is completed. When preparing the OB suggestions will be given in order to optimize the exposure times in the three arms to minimize time losses due to the different read-out times of the three arms, and on the fact that the UVB and VIS arm can only be read-out one after the other.

- **Is it possible to stare at the object in UVB and VIS while nodding in the NIR?**

Answer: No, this is not possible. In X-Shooter the offset applies rigidly and simultaneously to all arms.

- **Is it possible to bin (2x1, 1x2, 2x2) in the NIR arm?**

Answer: No, this is not possible. Only 1x1 read-out is offered.

- **Is it useful to attach arc exposures to night time science observations to improve the wavelength calibration accuracy?**

Answer: This probably makes sense only in the UVB arm, where there are very few night sky lines. For the VIS and especially NIR arms the number of night sky lines is sufficient to guarantee a good refinement of the wavelength solution achieved with the day-time arcs.

- **When do I start to be background dominated in the NIR?**

Answer: In the H band spectra a background-dominated (sky+diffuse background) between the OH lines for exposures longer than 10 minutes.

- **How long does it take typically to saturate the night sky lines in the NIR?**

Answer: With the Threshold Limited Readout (TLR), sky line saturation is not an issue. We have exposed 30min without any problem. Saturation is only a problem for very bright targets that would go over 100,000 electrons in less than about 2 seconds. Basically, with the TLR technique, the counts are computed from the count rate, deduced using all the unsaturated readouts. The detector is read-out every 0.6 sec, the counts accumulated and the count rate used to compute the counts one would reach in the exposure time if there were no saturation.

This corresponds to having effectively different exposure times for each pixel.

- **My target is not visible in the optical. How do I acquire it into the slit?**

Answer: You can use a blind offset from a field star. To set this up, you can use the ObsPrep tab in the p2 tool, as described in this tutorial. This tool will modify the OBs changing the OFFSET.RA, OFFSET.DEC fields of the acquisition window in p2 using the offset from the target to the aquisition star. The ObsPrep tool, together with p2fc, will also allow to create instrument-compliant Finding Charts showing the location of the acquisition star, as well as the target.

- **Do I need to provide specific OBs for the observation of Telluric Standards?**

Answer: Starting from Period 101, the Observatory will not supply telluric standard stars anymore. Users that require OBs for telluric coorection need to submit them in a concatenation with the science target. The OB for the Telluric Standard star should contain an acquisition template and the XSHOOTER_slt_cal_TelluricStd template. The corresponding execution time must be taken into account at Phase 1.

- **What is the meaning of the Position Angle for the Integral Field Unit?**

Answer: The Integral Field Unit (IFU) is rectangular. The position angle (PA) specifies the direction of the long side. So, PA=0 means that the IFU will be placed North-South.

- **Is it possible to have OBs longer than one hour with X-Shooter?**

Answer: Yes, this is in principle possible but, as for all other VLT instruments, it requires the approval by the Observatory. The request needs to be sent as a waiver. See this web page for more details.The user must be aware of the fact that **the correction for flexure is only made at the start of the exposure and may degrade over time**. However, the degredation is acceptable up to about an hour and 15 minutes.

- **What is the meaning of the SEQ.IFU.WLGT in the template for Integral Field Unit acquisition SHOOT_ifu_acq ?**

Answer: In IFU mode there is no correction for atmospheric dispersion. The two ADCs that come after the IFU in the light path are set to their OFF position, where they do not disperse light. Therefore, the user has to choose which wavelength will be kept fixed at the centre of the IFU during the observations. This is done through the SEQ.IFU.WLGT parameter. By default, this is set to the middle of the atmospheric dispersion range (470nm), but it can be set to any value within the X-Shooter range. To minimise the losses, we recommend to place the IFU along the parallactic angle. Also, the users should be aware that, at high airmasses, the amplitude of the dispersion is larger than the 4 arcsec long side of the IFU field. Therefore, depending on the particular choice of SEQ.IFU.WLGT, losses can occur at either edges of the spectral range.

- **After the acquisition I would like to add several science templates using different slits. Is this possible?**

Answer: Yes, this is possible. The various slits are placed very accurately on the right position, and hence there is no need for re-aquisition. You can use any slit you wish after the acquisition.

- **Will I get pipeline reduced data for X-Shooter? To which level?**

Answer: The X-Shooter pipeline available with the Esoreflex package provides reduced spectra, which are extracted (1D), wavelength and flux calibrated. Telluric correction can then be performed with the molecfit tool. The fully reduced spectra are also available for X-Shooter a few days after the observations are taken.

- **What is the wavelength scale of the reduced X-Shooter spectra?**

Answer: The wavelength scale of the X-Shooter spectra reduced by the pipeline is in air.

- **How is the sky emission modelled in the ETC?**

Answer: The ETC of X-Shooter is using a sky background model with lower spectral resolution than the spectrograph. In particular, it samples the underlying model (http://www.eso.org/observing/etc/doc/skycalc/The_Cerro_Paranal_Advanced_Sky_Model.pdf), called ASM, by only estimating the model for three points in each spectral order, and the input source models it uses are low resolution. This limits the validity of the model, and explains the lack of variations with different values of PWV. Future versions of the ETC will solve this issue.

- **What is the minimum integration time in the NIR?**

Answer: The minimum DIT is 0.665 seconds. This is the time the IRACE controller takes to read-out the full detector. Entering shorter (or even zero) DIT times in the OBs will always produce effective DITs of 0.665 seconds.

- **I have a target which is very bright in the NIR, but no so much in the optical. Even with the shortest DIT the object is going to cause strong remnants in the NIR arm. How can I solve this problem?**

Answer: In principle one can set the NIR slit to the "blind" position, which would effectively close the NIR spectrograph entrance. However, this is not offered in Service Mode. If you really need to do this you must apply for Visitor Mode.

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- Phase 2

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