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NIRSpec Technical Note
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Aperture positions in SLIT/MOS imaging mode

Abstract:

We provide a description of the tables containing the positions of NIRSpec apertures in various image planes and in imaging mode.

Change log		
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1	29.09.2013	PF: Creation

1 INTRODUCTION AND SCOPE OF THE NOTE

Using the NIRSpec instrument model prepared by B. Dorner using data from the FM2 cycle-1 cryogenic test campaign, we have generated tables containing the positions of NIRSpec apertures (fixed-slits and micro-shutters) in various image planes and in SLIT/MOS imaging mode.
In this very short technical note, we provide a brief description of the inputs used to generate these tables, a list of main caveats associated to these tables and finally, a description of their format.

Note: the tables do not contain the position of the images of the IFU pseudo-slits in IFU imaging mode. They only contain the positions of the apertures visible in SLIT/MOS imaging mode.

2 INPUTS AND CAVEATS

2.1 Inputs used to generate these tables

These tables have been generated using the reference NIRSpec instrument model "NIRS_FM2_05_fitted_cal2a" generated by B. Dorner based on data from the FM2 cycle-1 cryogenic test campaign. We have used the following elements of the model: the OTEIP to MSA coordinate transform ("Fore_CLEAR.pcf"; coordinate transform for the CLEAR FWA position); the MSA geometrical model ("MSA.msa"); the coordinate transforms for the spectrograph ("Collimator.pcf" and "Camera.pcf"); the description file for the MIRROR ("disperser_MIRROR.dis"); and the FPA geometrical model ("FPA.fpa").
In order to project the apertures on the "sky" (telescope coordinates), we have also use an "as-designed" model of the JWST telescope (corresponding to the IPS model OTE05).

2.2 Caveats

It is extremely important to realise that the positions listed in these tables are valid for the reference grating wheel mirror position during FM2 cycle-1 only.
So please, always keep in mind that:

- Each time NIRSpec is configured into its imaging mode, the grating wheel does not go back exactly to the same position. As a consequence, the projection of the image of the apertures on the FPA will vary by a few pixels around the positions listed in the tables, even during FM2 cycle-1. For a given exposure, the reading of the grating wheel position sensors must be used to compute the shift and the actual position.
- Shifts of several pixels have been observed between different cryogenic test campaigns (e.g. between FM2 cycle-1 and cycle-2). The positions listed in the tables

are only valid for FM2 cycle-1 (and for the reference grating wheel position, see above).

Last, the OTEIP to MSA coordinate transform used to generate the aperture positions is for the CLEAR filter (small changes are expected when using a different filter).

3 THE TABLES AND THEIR FORMAT

3.1 List of files

Five different tables have been generated (one for the fixed-slits and four for the micro-shutters). The names of the files are listed below.

Filename	Contents
onSkyAndOnDetectorProjectionSLIT_NIRS_FM2_05_fitted_cal2a.fits	Position and size of the fixed-slits and of the IFU aperture.
onSkyAndOnDetectorProjectionMSA_Q1_NIRS_FM2_05_fitted_cal2a.fits	Position and size of the micro-shutters of quadrant Q1.
onSkyAndOnDetectorProjectionMSA_Q2_NIRS_FM2_05_fitted_cal2a.fits	Position and size of the micro-shutters of quadrant Q2.
onSkyAndOnDetectorProjectionMSA_Q3_NIRS_FM2_05_fitted_cal2a.fits	Position and size of the micro-shutters of quadrant Q3.
onSkyAndOnDetectorProjectionMSA_Q4_NIRS_FM2_05_fitted_cal2a.fits	Position and size of the micro-shutters of quadrant Q4.

3.2 The format of the files

The files are FITS binary tables. The columns are listed below.

Column name	**Contents**	**Comment**
NAME	Name of the apertures.	For the fixed-slits only.
Q, INDEX, I, J	Micro-shutter quadrant (Q) and position (I,J). The index is defined as INDEX = I + 365 * (J – 1).	For the micro-shutters only. I in [1, 365] J in [1, 171]
XPOSMSA, YPOSMSA	Position in the MSA plane in meter.	

XSIZEMSA, YSIZEMSA	Size in the MSA plane in meter.	
XPOSSKY, YPOSSKY	Position on the sky (telescope coordinates) in degrees.	
XSIZESKY, YSIZESKY	Projected size of the apertures on the sky in arcsec.	
IPOS491, JPOS491	Position in "fractional" pixel coordinates on SCA491.	Only values in the [0.5,2048.5] range are "valid" coordinates.
IPOS492, JPOS492	Position in "fractional" pixel coordinates on SCA492. CAUTION: special orientation for SCA492.	Only values in the [0.5,2048.5] range are "valid" coordinates.
ISIZESCA, JSIZESCA	Size in the FPA plane in pixels.	

In the MSA and FPA planes, the x-axis corresponds to the direction of dispersion.