Offset between slit and reference position in MIDI in 2012

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In December 2008 I noticed an offset between the reference position for the source in MIDI and the position of the slit: by default the source was not perfectly centred in the slit, but offset to the left by about one pixel. The full report from 23 December 2008 can be found at www.blackholes.de/downloads.html. As a result of this report, the reference pixels were updated sometime in January 2009 to $x_{A1} = 30.0$, $y_{A1} = 31.7$ (in window 1) and $x_{B2} = 29.0$, $y_{B2} = 32.0$ (in window 2) in IDL coordinates (counting starts with 0) or $\tilde{x}_{A1} = 191.0$, $\tilde{y}_{A1} = 78.7$ and $\tilde{x}_{B2} = 190.0$, $\tilde{y}_{B2} = 164.0$ in detector coordinates (counting starts with 1).

Although suggested in the previous report, the alignment was never checked empirically by obtaining another set of acquisition images with the slit inserted. A normal acquisition image taken in August 2011 however clearly shows that the calibrator is perfectly centered on the updated reference pixels (less than 0.1 pixels offset). This can be seen in Fig. 1. In this figure (and all following figures), the reference pixels after January 2009 are indicated by blue crosses. The slit position as determined from the observations in December 2008 is marked by the blue lines. Clearly, the source is located perfectly in the middle of the slit.

Only on 13 September 2011 and 30 October 2012, acquisition images with the slit inserted were taken again. The normal acquisition images and the images with the slit inserted are shown in Figs. 2 to 5. The September 2011 observations were carried out with the ATs , the observation in October 2012 with the UTs. In all these images the source has moved back one pixel to the left, as was the case before January 2009. The positions of the peaks in fact agree to the pre 2009 reference position to within 0.3 pixels. In the images with the slit inserted, the PSF is clearly elongated due to slit losses as discussed in the report from December 2008. The position of the slit has not changed: the blue lines still describe the slit position accurately. The images also show that the location does not depend on the type of telescopes used. Also in other regular acquisition images (observed e.g. in February and May 2012) the source is centred one pixel left of the ideal reference position. Hence the most likely explanation is that the old reference positions were reactivated in August or September 2011.

I suggest to adjust the reference pixels once more so that the target PSF lies again in the centre of the slit. This is achieved by adding again $\Delta x = +1$ pixel to both of the reference pixel positions so that they take the values cited above. The correction should then be verified by repeating acquisition images with the slit inserted as well as images with the beamcombiner inserted and only shutter A or B open. This was also suggested in the last report, but not carried out. As in the previous report, I further suggest that the experiment should be repeated once in a while to test for possible drifts in the target position with respect to the MIDI hardware or that the old reference positions are not reactivated.

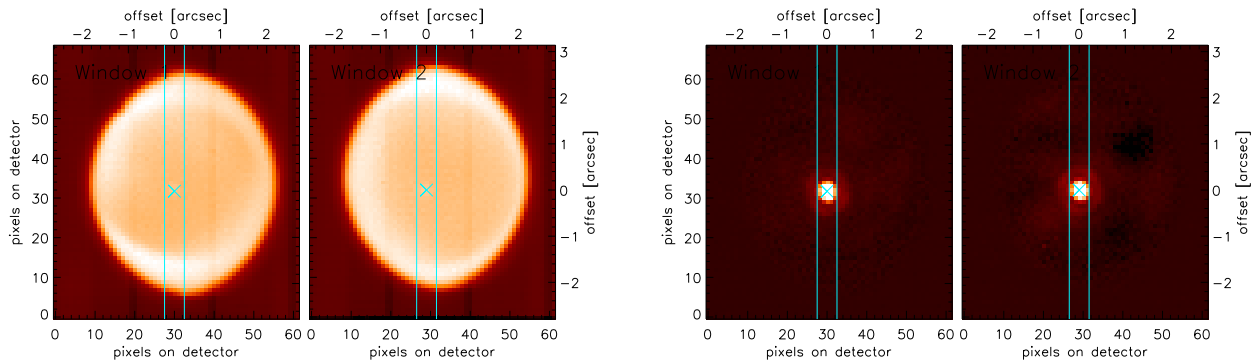

Figure 1: Raw frame (left) and chopped image (right) of `MIDI.2011-08-18T00:03:16.fits`, i.e. a standard MIDI acquisition image taken at the start of a UT night in August 2011. The reference positions marked by blue crosses are those after the update in January 2009. The slit is indicated by the two blue lines.

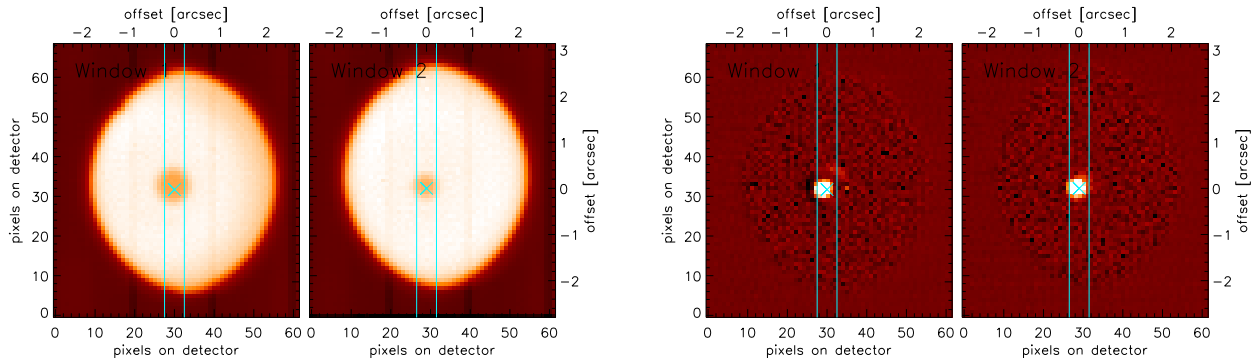

Figure 2: Raw frame (left) and chopped image (right) of `MIDI.2011-09-13T02:07:00.fits`, i.e. a standard MIDI acquisition with the ATs.

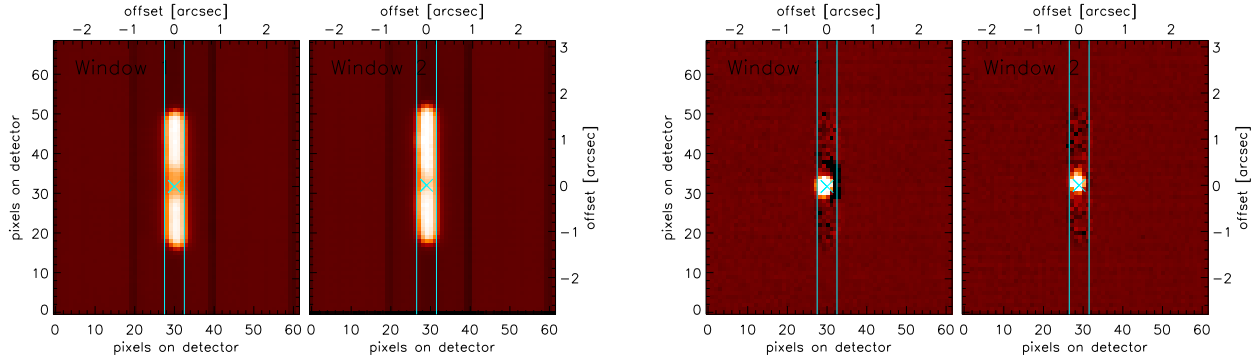

Figure 3: Raw frame (left) and chopped image (right) of `MIDI.2011-09-13T02:11:58.fits`, i.e. a MIDI acquisition with the slit inserted on the ATs.

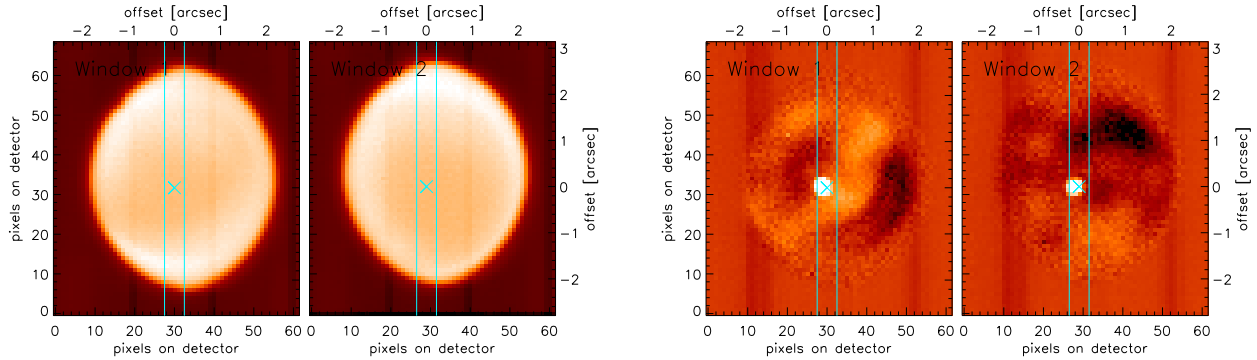

Figure 4: Raw frame (left) and chopped image (right) of `MIDI.2012-10-30T00:59:35.fits`, i.e. the standard MIDI acquisition image with the UTs.

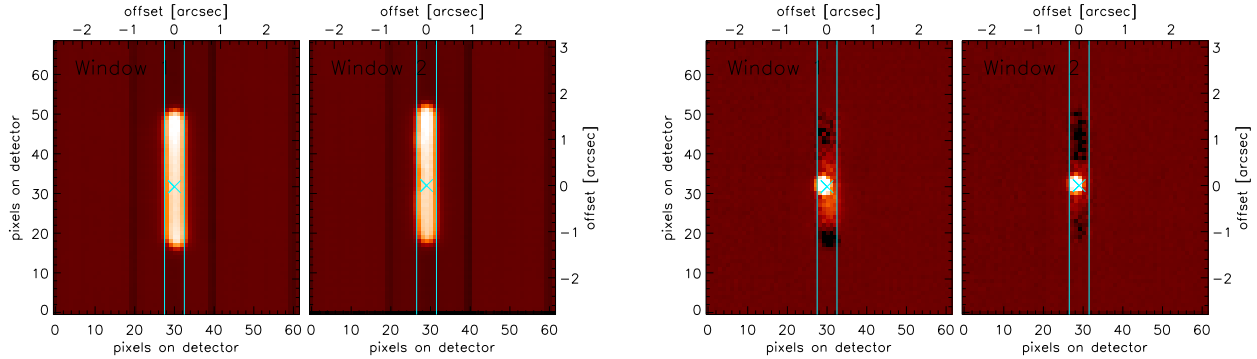

Figure 5: Raw frame (left) and chopped image (right) of `MIDI.2012-10-30T01:03:01.fits`, i.e. an acquisition image with the slit inserted.