PACS Newsletter

Nr. 14, 22 December 2006

The PACS Picture of the Week

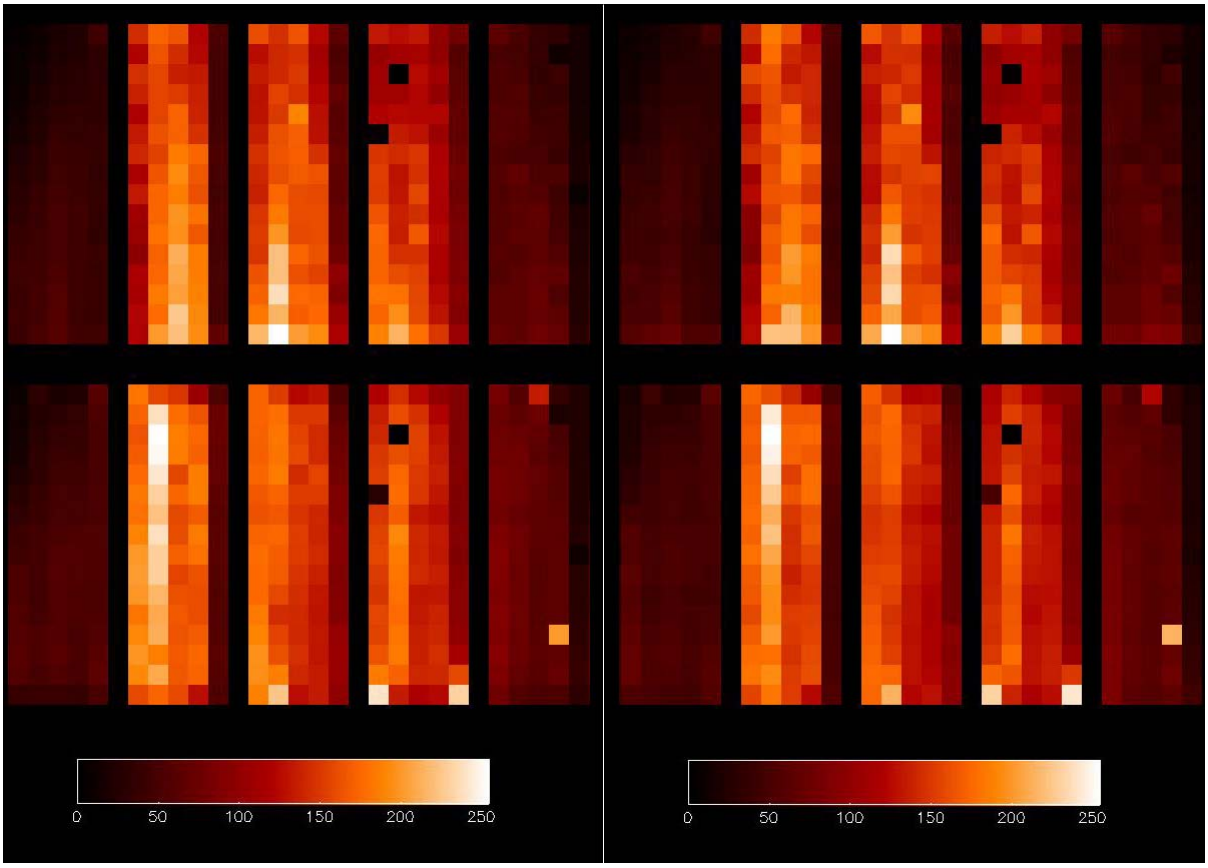

Fig.1: Illumination pattern on the blue spectrometer detector (BB source). Left: Filter A; right: Filter B. Top: raw signals; bottom: responsivity-corrected

Status

During the last two weeks we did tests with both the photometer and the spectrometer. Spectrometer tests mainly included measurements with the xy-stage, with hole masks of different aperture sizes (for PSF and distortion measurements), and with the water vapour cell (for wavelength calibration). By rastering a point source over the field of view we were able to measure PSFs for all 25 (spatial) pixels in both the blue and the red spectrometer branch. This in turn allowed a closer analysis of the "vignetting" problem which was reported in Newsletter #12: The light loss in the leftmost block of 5 detectors (bottom slice) is stronger than in rightmost block (top slice), see Figure 1. The illumination of the rightmost module in each block is reduced by a somewhat variable factor. The PSF in the bottom and top slices is elongated (Figure 2), i.e. the slices with the largest light loss also have the widest PSF. The right-most pixels in the bottom rows show a clear "wrap-around" or "spill-over" into the next

slice. The red spectrometer shows exactly the same anomaly as the blue one. The good news is that through an analysis of these data (in particular comparing blue and red data) we believe we understand the cause for the problem: it is not the dichroic, which seems to be in perfect condition (see Figure 3). The misalignment must occur in the slicer optics (the slicer itself and the capture and slit mirrors), because the problem occurs in both the blue and the red spectrometer. Probably these mirrors have moved during cryo-vibration. We will warm up and open PACS over Christmas to investigate this problem in more detail (and hopefully fix it). During this time we also hope to fix the chopper problem by replacing the chopper (which is actually the FS module) with another module (the original FM module). An NRB about the chopper was held this week. The slicer misalignment NRB will be held on January 4 at MPE.

One good news in this field is that the shape and width of the PSF in the "good" (central) pixels is exactly as calculated/modeled!

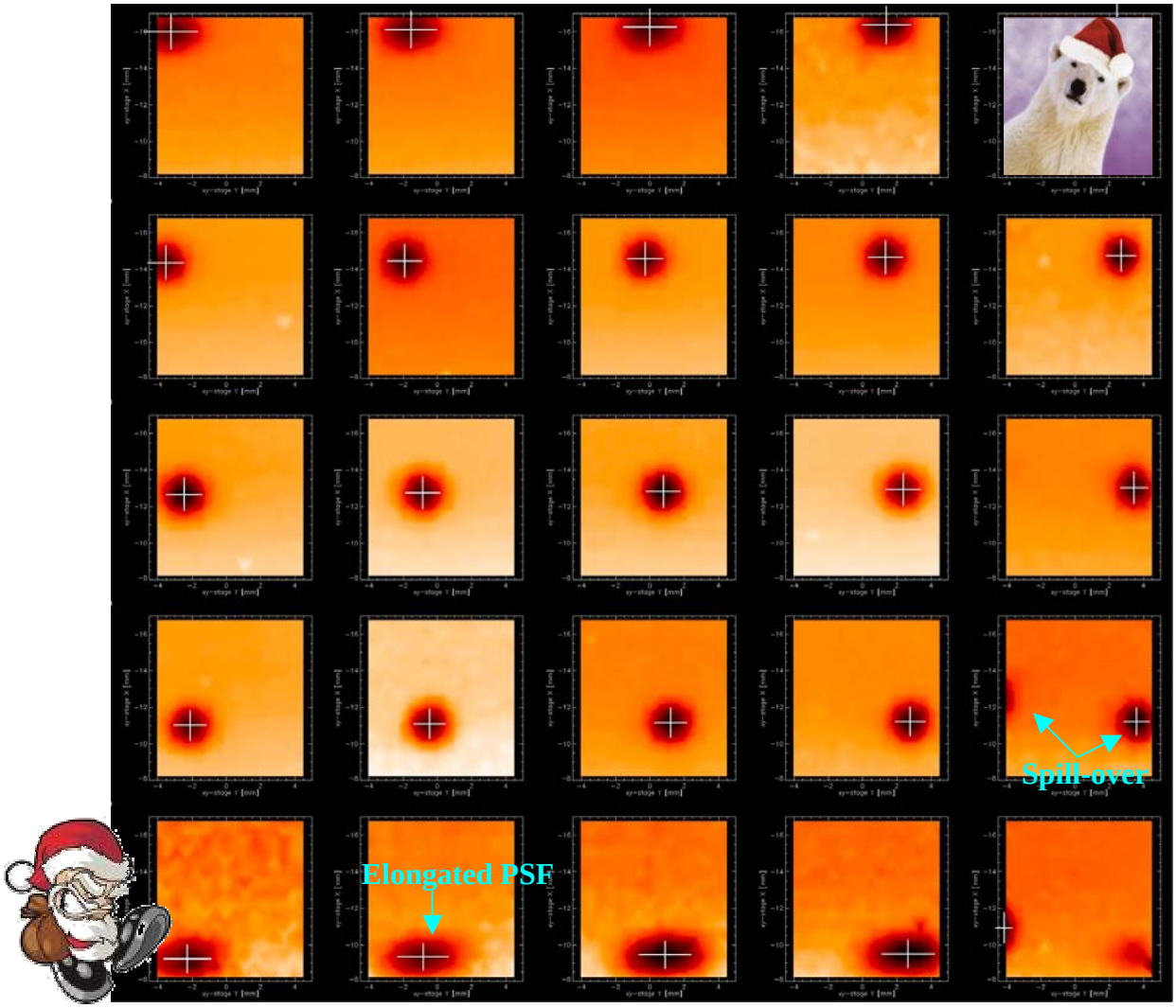

Fig. 2: Field-of-view scan of the PACS blue spectrometer with an external point source on the xy-stage.

The photometer tests included mainly measurements to determine the optimal bolometer bias settings for best responsivity/NEP in both low and high gain. These were long tests (up to 36 hours) that run autonomously (and finally without non-nominal events) over night, which eases the life of the test team enormously.

At last another good message: we also did rudimentary blue and red spectrometer NEP measurements (comparing the resulting signal-to-noise ratio for a given input power). The preliminary analysis of these data seem to show good agreement between expectations and real data. Initial NEP numbers for the photometers look very promising, too.

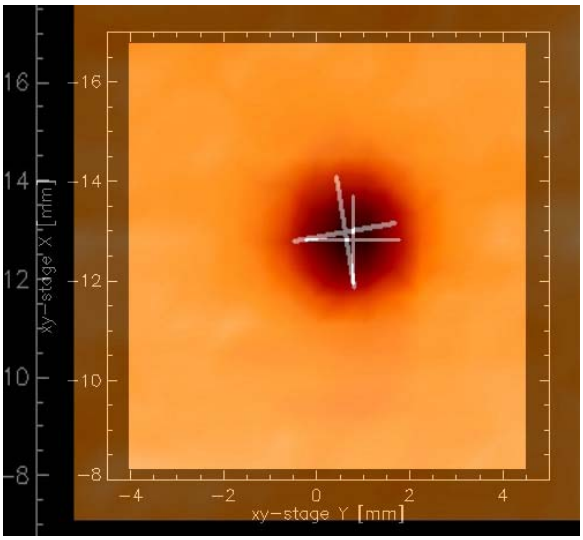

Fig.3: Overlay of the PSFs measured for the central module in the red and blue array. Both arrays are registered within <1/5 of a pixel – this means the alignment of the dichroic is ok; the misalignment must occur entirely in the slicer / rest of the spectrometer.

Now the PACS **F**M **I**LT **T**eam (*PACS FIT*) is looking forward to a few - hopefully quiet and peaceful - days to relax.

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