ADC problem, 18-04-2010

On the night of 18-04-2010 it was noticed that many spectra were being reduced by the pipeline with a warning message complaining about the flux distribution in the spectra. The problem was identified as originating from the ADC. In particular, the “ADC1” was not working anymore. The next few nights were carried over without the ADC, limiting observations to targets with airmass < 1.15 at the time of the observation, while the ADC was sent for repairs to Paranal.

The figure below shows the damaged spindle and gear.

![Damaged spindle and gear](image)

The ADC was shipped to Paranal, where a new gear was manufactured and installed, and where the two prisms were realigned. The prisms were re-aligned (by Stephane Guisard & Co.) so that their combination shows zero dispersion. This was measured using a collimated point source on one side and a sighting telescope on the other side of the ADC. One prism was rotated (using the motor) until dispersion could not be seen anymore. Accuracy of orientation of one prism with respect to the other is +/-7 degrees on the prism rotation angle. This procedure only aligns one prism with respect to the other.
The alignment could be confirmed qualitatively by looking at the profile of the two prisms of the ADC, and noticing that the dispersion directions of the two prisms was parallel and the slope of the prisms opposite (i.e. they are working one against the other in this configuration). To be noticed that the two prisms have an arrow marked in the border indicating the apex. For some reason the arrow on the upper prism (ADC1) seemed misplaced by ~ 10 degrees counterclockwise (viewing the table from the top).

The absolute alignment of the two prisms is done at the telescope, considering the measured neutral position at encoder steps: ADC1=3500 and ADC2=575, the counterclockwise rotation with increasing number of encoder steps, the angle to encoder steps conversion (360 degrees = 4000 steps), and the prisms configuration for encoder steps = 0,0:

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<table>
<thead>
<tr>
<th>ADC1</th>
<th>N</th>
<th>ADC2</th>
</tr>
</thead>
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The angles between the direction of maximum dispersion of ADC1 and the North, and ADC2 and the North, are almost identical to 45 degrees. The only change that had to be done to align the ADC was the definition of the offset constants in the database. The constants were: 1900, 3025, while the final ones aligning the tip tilt table are 3432, 2507.

The plot below shows, for various airmasses, the flux ratio of the ADC/No ADC data.