Notebooks:App3/2013/August Week3

From atomwiki

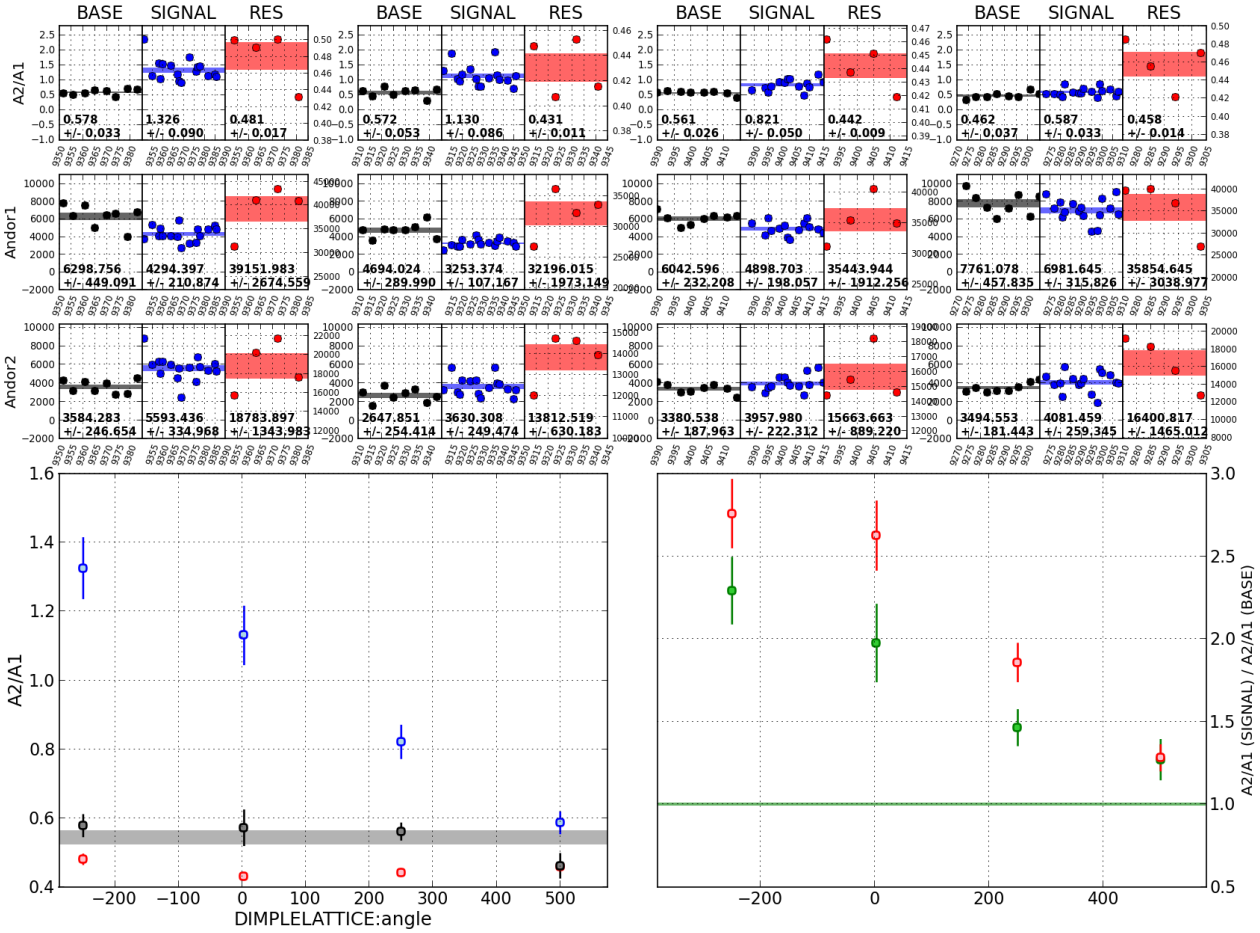
Input rocking curve attempt with reduced aperture

Last week we set out on our attempt to do the rocking curve by varying the angle of the input Bragg beam. The idea was to put an iris in front of the first lens to reduce the output aperture and thus increase the K-vector resolution for the rocking curve. On Friday we worked on attempts to determine the location of the aperture that would go in front of the lens. We decided that the bottom part of the lens had more Bragg by taking data with masks that would allow light to only go through one quadrant of the lens.

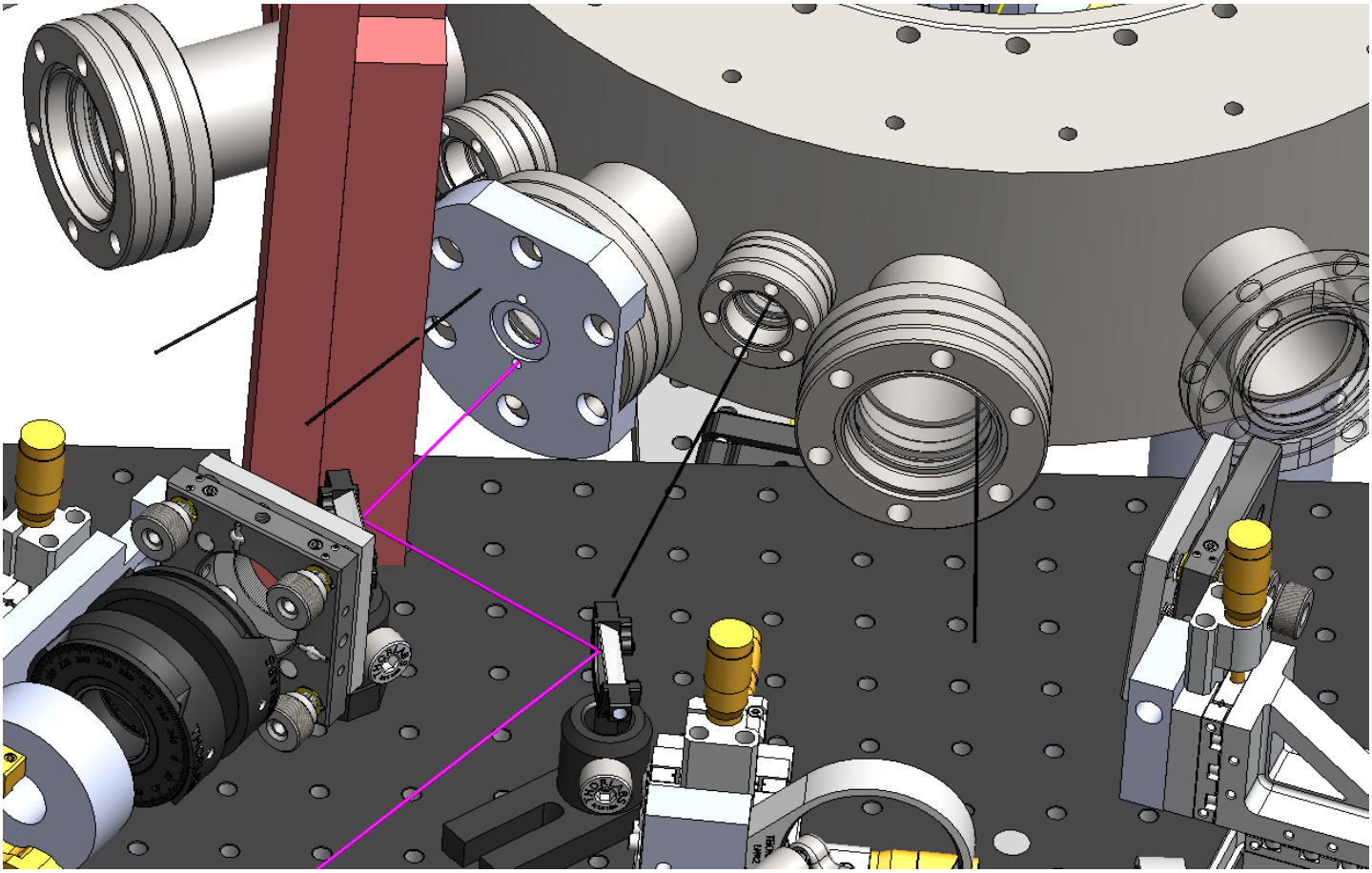
On Monday we started using the setup with the aperture to attempt the rocking curve but the data was not tellling us anything too clear. We have too much trouble getting decent data whenever we put an aperture in front of the first lens. In the process of those attempts we decided to get another control measuerment by sending in the Bragg beam through another window of the chamber, we used a window at 30 degrees from the nominal Bragg window. We went back to the full lens aperture and we could see a clear difference between input at 30 degrees and input at the nominal position. 30 degrees is ~500 mrad so it was good to see that the Bragg was not there at 500 mrad, as expected.

Really broad input rocking curve using several viewports

While doing this it occurred to us that we could send the Bragg beam through two more viewports, which are at +250 mrad and -250 mrad. On Tuesday we managed to get Bragg light through those viewportss and aligned it onto the atoms. We took Bragg data at each of these four points, -250 mrad, Nominal position, +250 mrad, 500 mrad. The results of that are shown below. The lower left plot is the full normalized data: green points are normalized to the signal from a sample with 250 us tof and the red points are normalized to the signal when using bragg on resonance with one of the states.



This results encouraged us to find more ways to send in the Bragg beam at different angles. Today (Wednesday) we managed to get another direction going in, from the same viewport that the nominal direction is in, but with an angle change of about -100 mrad. The idea tonight is to take data from our five possible Bragg input beams and see what kind of information we can extract from such a curve. An image showing the Bragg directions that we have available is shown below. Purple is the nominal Bragg input, and the other four are in Black.



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