

CO-PHASING WITH THE CHARA PHASE REFERENCE

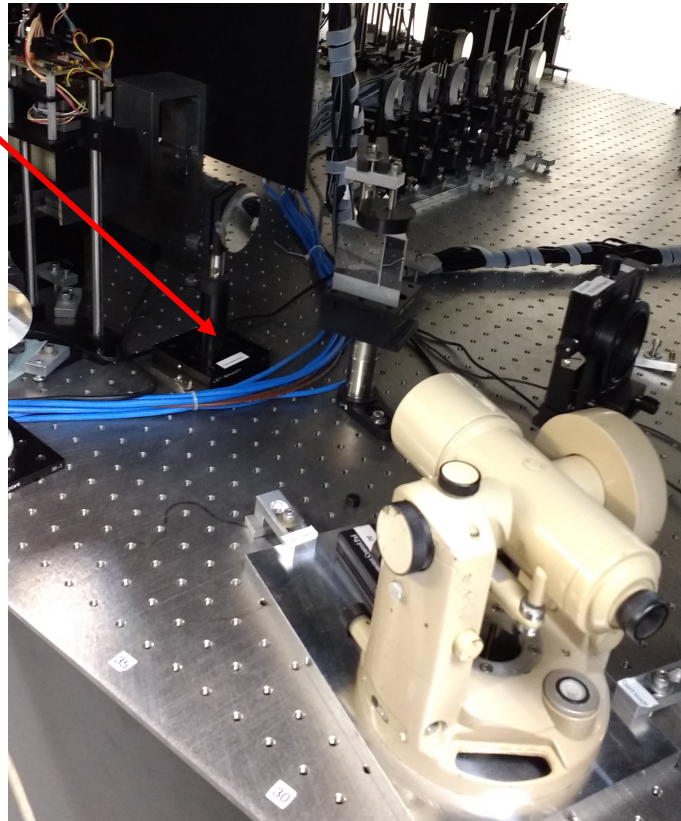
Judit Sturmann

The phase reference for the CHARA-Array is the visible beam combiner (VIS Beams). In order to co-phase beam combiners “VIS Beams” provides two alignment beams at a time, which can be selected using the “VIS Beams” GUI. The choices are: 1&2, 2&3, 3&4, 4&5, 5&6, and 6&1.

Finding and viewing VIS fringes

The first step in co-phasing is to find VIS fringes by the “VIS Beams” combiner using the internal white light source.

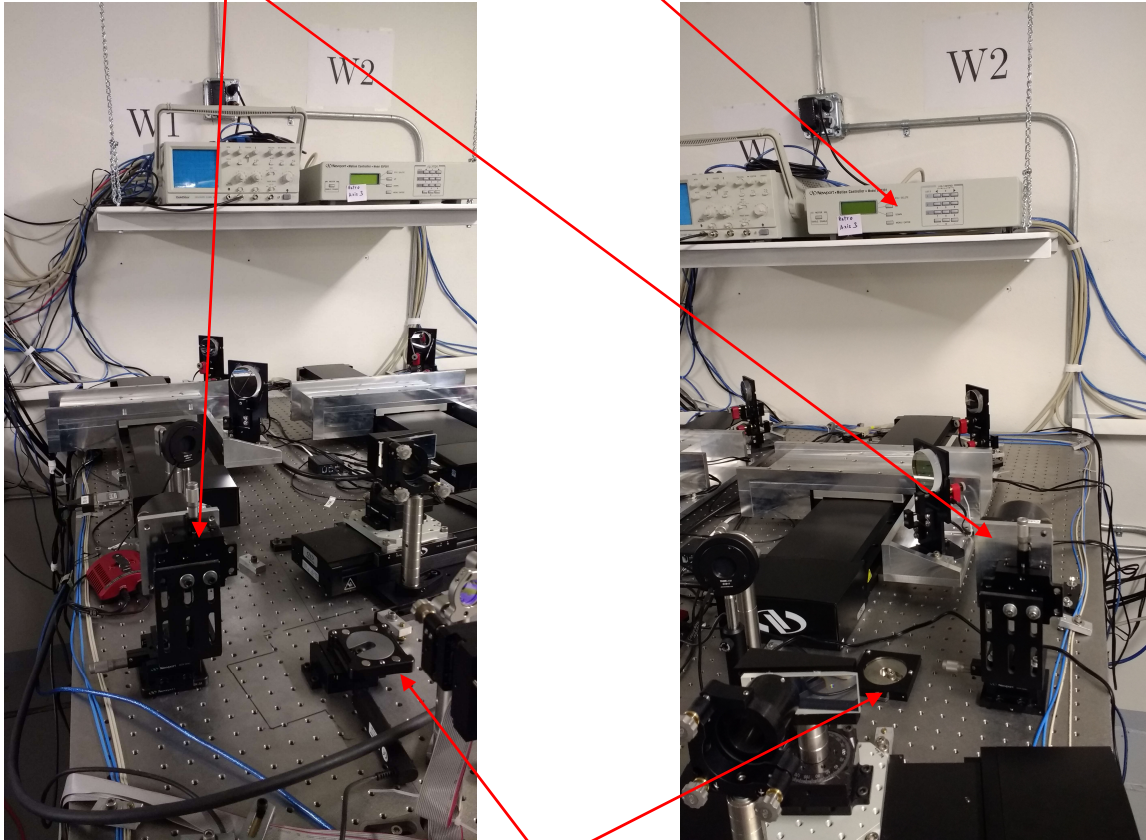
Channel fringes can be observed with CHANCAM, after the dedicated fold mirror (oval shaped) is put in place on the VIS table for CHANCAM. The label on the mirror base reads:
“Fold to MedResSpect”



CHANCAM can see the two beams - selected with “VIS-beams” beam sampler stage - reflected back by the BIG-retros.

The BIG-retros currently aligned on the W table, they should be placed on the dedicated kinematic bases for fringe finding. The base at W1 is on a remotely actuated translation stage controlled by a Newport ESP controller called “Retro”. This controller is normally off; do not forget to turn it on.

BIG-retros out:



The kinematic bases for the BIG-retros.

The server RETRO to talk to the ESP controller runs on ctrscrut, the GUI is listed under ESP controllers.

When looking for internal fringes align W1 on beam N, and W2 on beam N+1, where $1 \leq N \leq 5$.

The X,Y positions of the BIG-retro corner cubes can be precisely controlled by manual micrometers. Make sure that the retros are centered on the incoming beam in order to avoid extra path within the corner cubes. If the cubes are not centered on the beams, you would find the fringes off from the positions listed below. A good check is looking at the incoming and outgoing beams near the edge of a piece of white paper.

In order to view CHANCAM images, the reference camera power has to be on (“REF CCD” on Power GUI), and the “REFCAM server” has to be started. Press CHANCAM in “RefCam” GUI, this will display the image by CHANCAM. Open WL shutter and the shutters of the two beams selected for fringes.

The positions of the remotely controllable translation stage where CHARA VIS fringes were found are listed below.

As of May 23, 2017

VIS-beams	RETRO axis 3: RETE1 positions [mm]		
W1 & W2	Stage on W1		
1&2		6.4462	
2&3		7.9085	
3&4		7.6254	
4&5		7.6343	
5&6		7.6075	

Co-phasing with other beam combiners

Do the routine alignment up to the point when the beam sampler dichroics (W1DICHR, W2DICHR) are aligned, and also the IR mirrors for IR combiners. The listed fringe positions are normally repeatable to better than 1/10th of 1 mm. No need to check VIS fringes again as described above, but if you want to be sure, VIS fringes will be easily found around the above listed positions.

A useful tip: First, check/adjust the laser beams on each VIS-beams pairs on the E table. The W beam sampler stages are straight enough, so it is enough to do the routine dichroic alignment to align W1 on beam 1 and W2 on beam 2, find fringes then just move VIS-beams to the next pair, beam 2&3, move W1 to beam 2 and W2 to beam 3, no further alignment check is really necessary. You could then just search for fringes on beams 2&3, and so on.

Home “RETE1” before start searching to avoid running into limits. The searching range with “RETE1” is roughly from 0 to 12 mm. In most cases it is easier to search for fringes made by the other combiner by moving the “RETE1” stage, but in the end the other beam combiner should be walked back to the position where “RETE1” is listed for VIS fringes.