

Title: Array Site Reports cont.

Date: Nov 13, 2014 10:20 AM

URL: <http://pirsa.org/14110100>

Abstract:

CARMA status

Dick Plambeck, UC Berkeley



- 2 VLBI stations!
 - beamformer phases 8 telescopes (equivalent of a 25-m single dish)
 - one 10-m telescope is operated as a separate station for calibration purposes

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MacMahon, Matt Dexter, Alan Rogers, Jason SooHoo, Christiaan Brinkerink, Laurent Loinard, Joe Lazio, Gisela Ortiz, ...



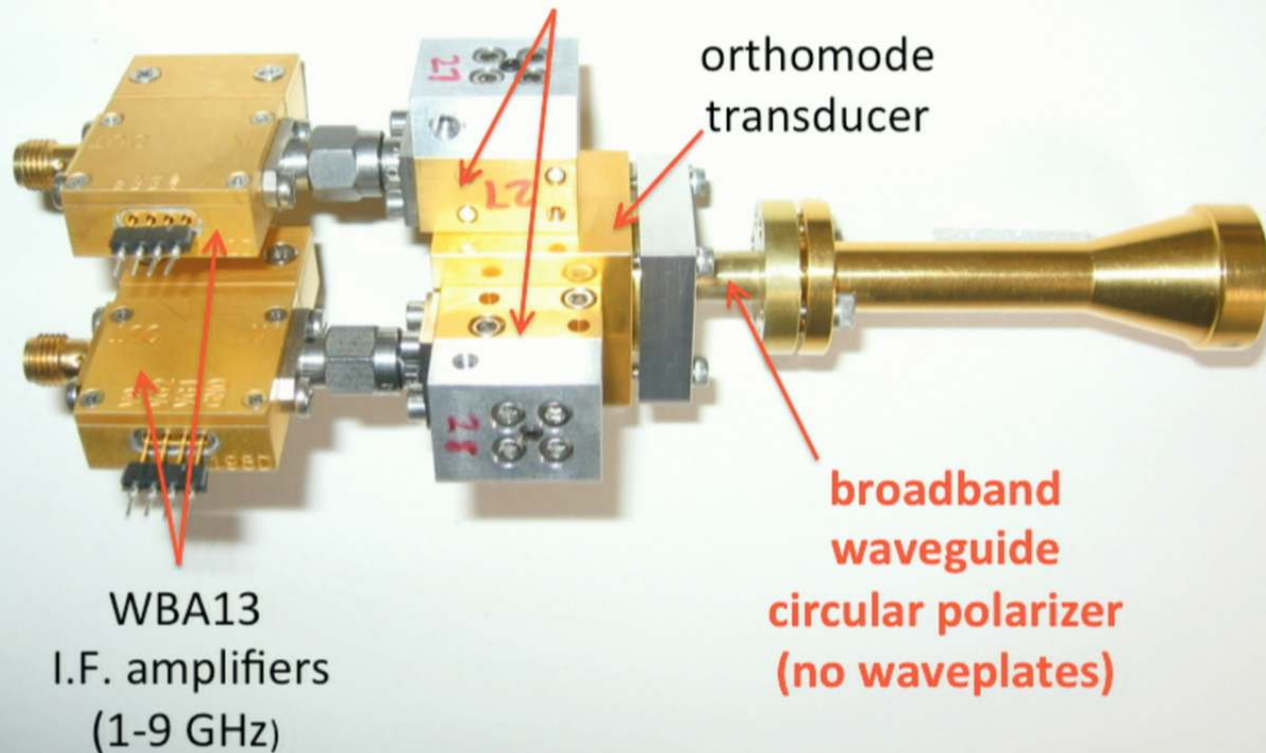
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1mm dual polarization receivers

**SIS mixers – ALMA Band 6
devices in DSB mixer block**

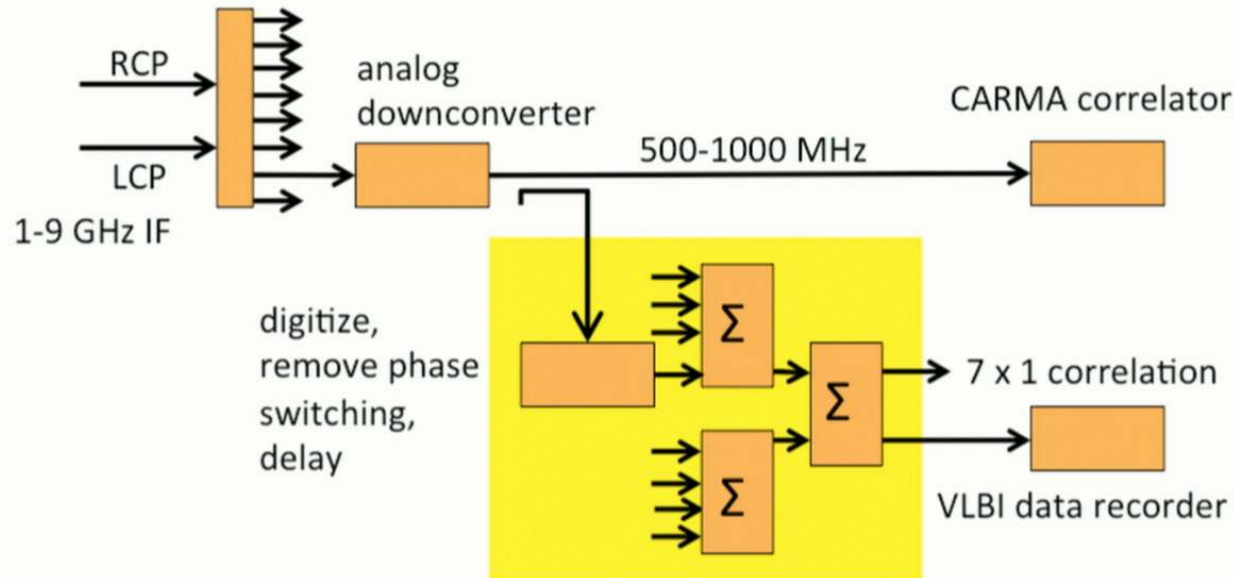


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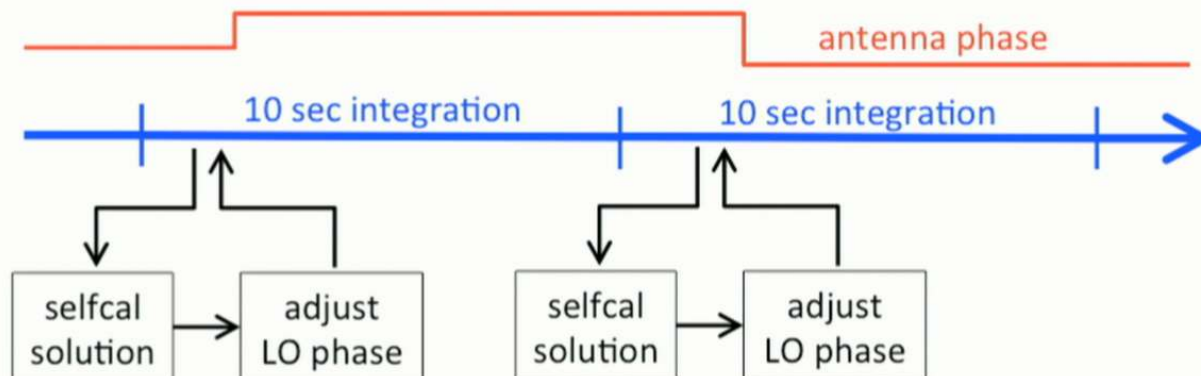
beamformer (SMA - Berkeley development) operates in parallel with CARMA correlator



- each beamformer phases 8 telescopes, 500 MHz bw

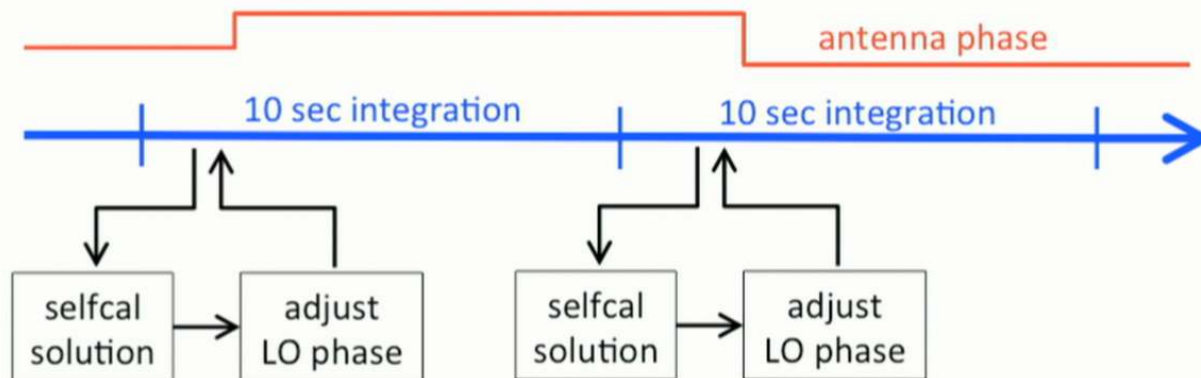
antenna phasing

- phase up beamformers on a strong calibrator at beginning of each night, using 7 baseline \times 500 MHz correlator
- thereafter, use 105 baseline \times 4 GHz CARMA correlator to maintain phase relationship of antennas



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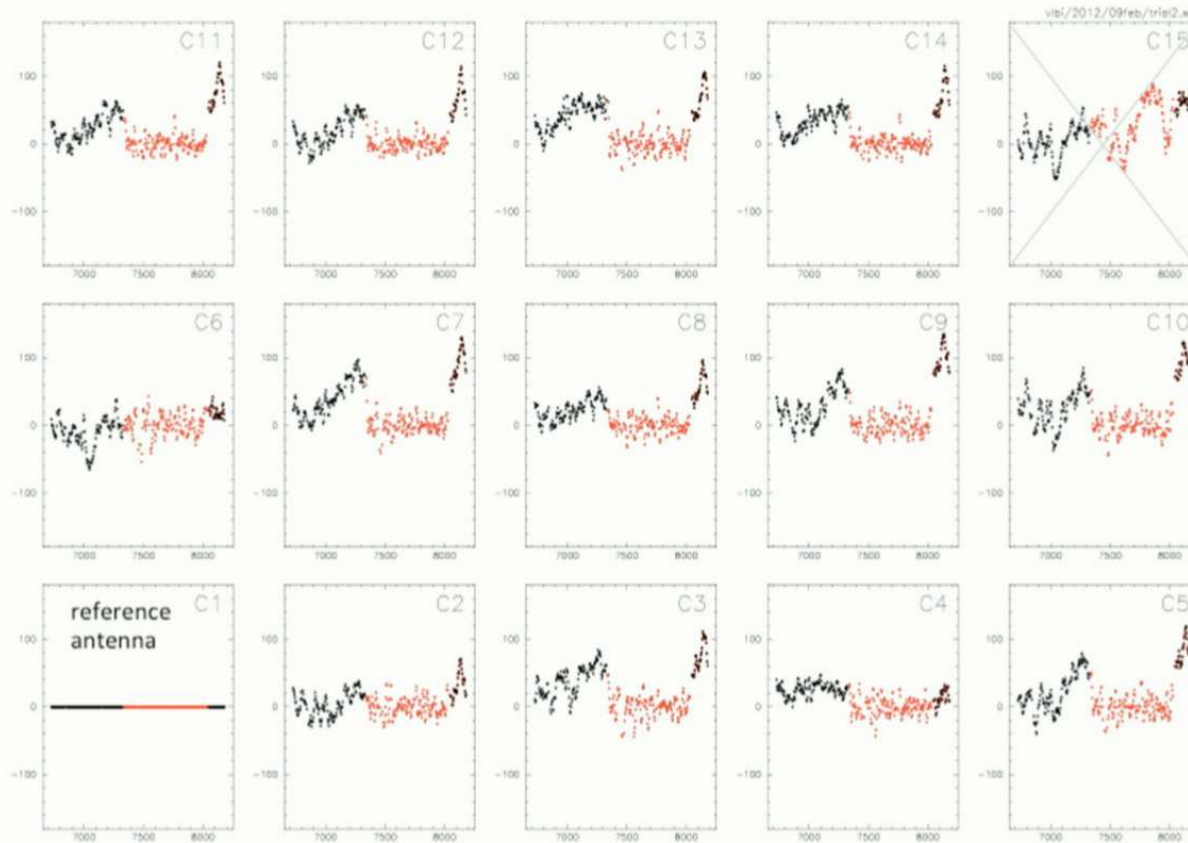


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unphased (black) vs. phased (red)



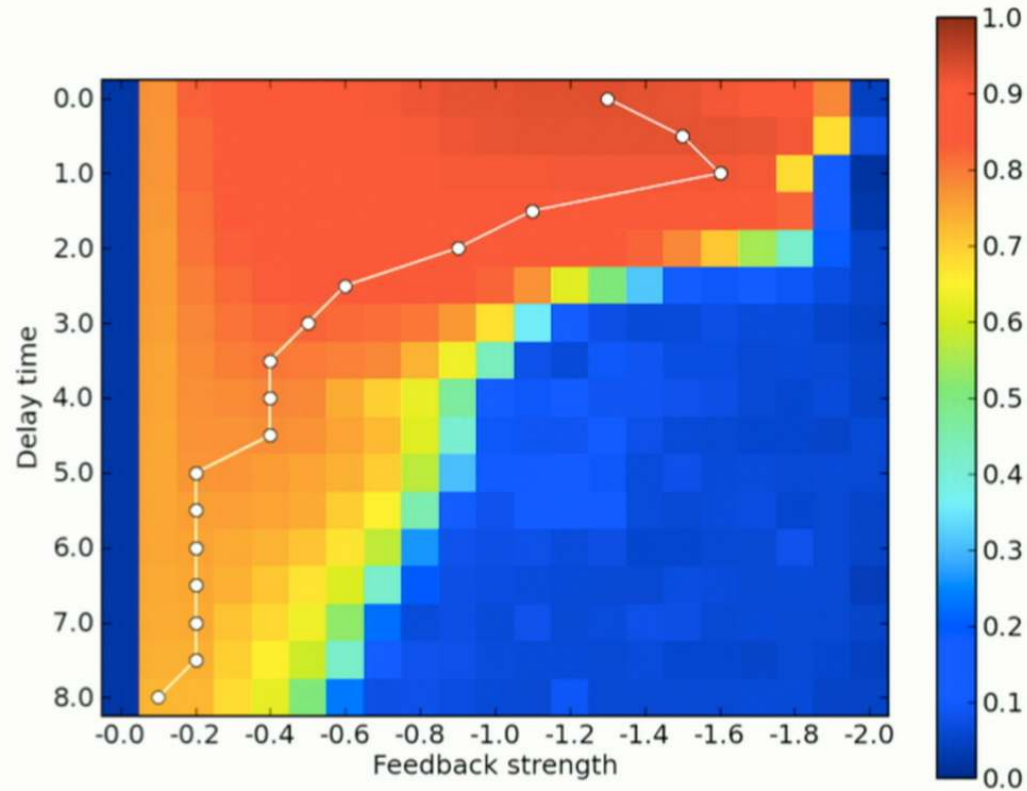
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phasing eff vs time delay, feedback strength

real data (4 sec integrations), simulated phasing
(Christiaan Brinkerink)



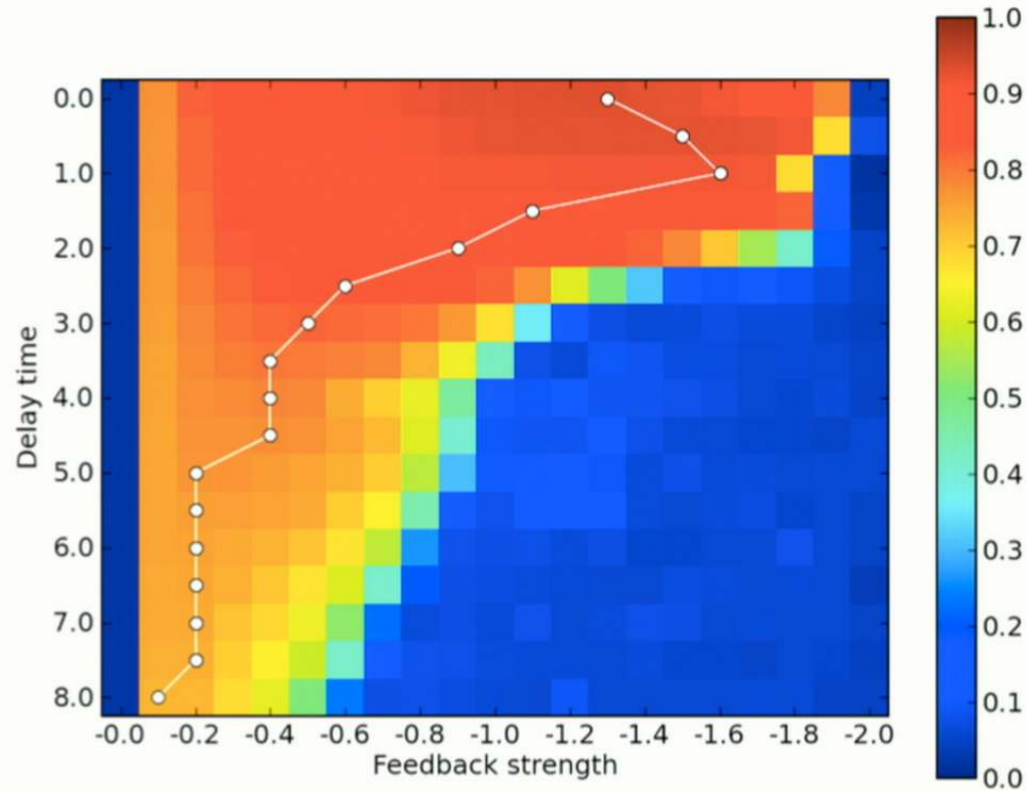
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phasing eff vs time delay, feedback strength

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(Christiaan Brinkerink)

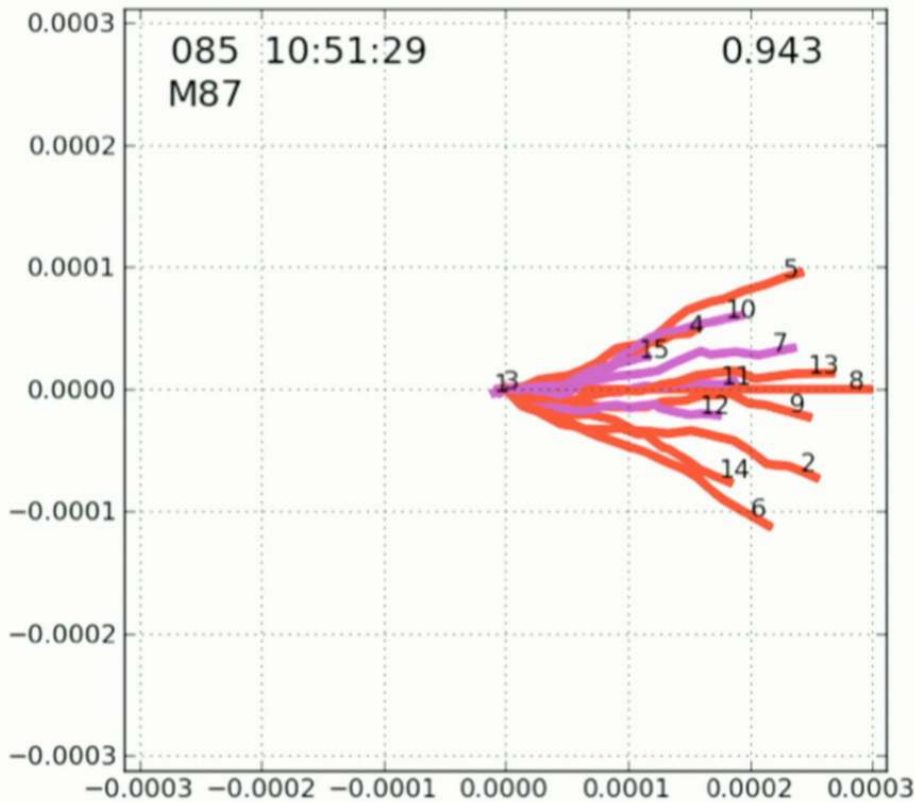


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phasing diagram



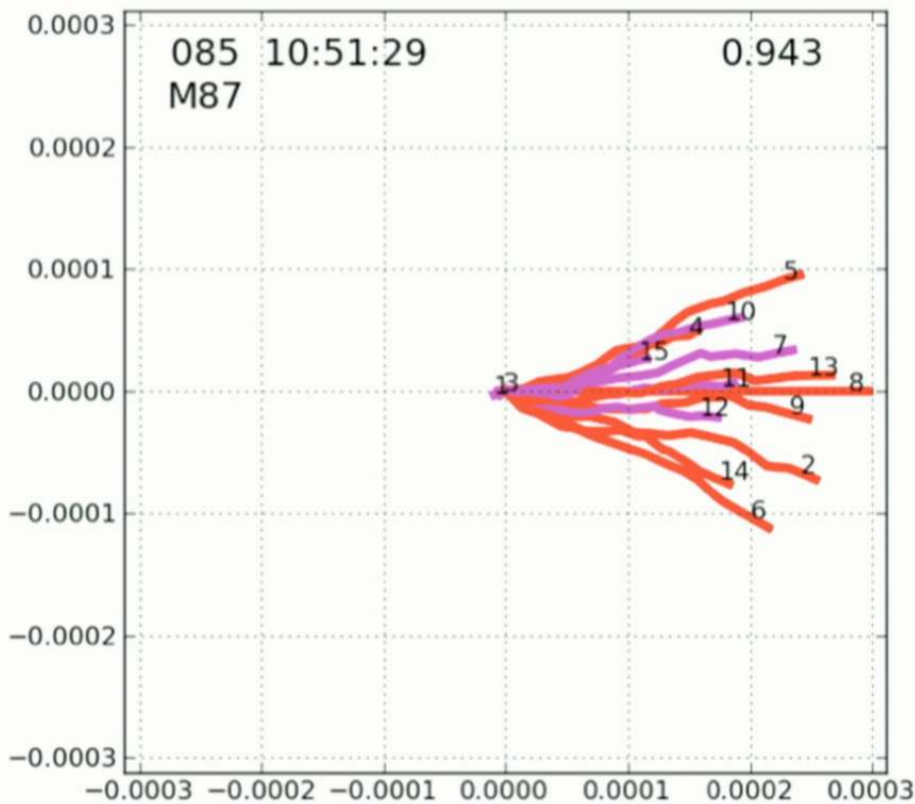
- visualizes selfcal solution from previous 10-sec integration
- 1 “SNR” vector per antenna
- 16 segments/vector (spectral windows)
- red: included in phased sum

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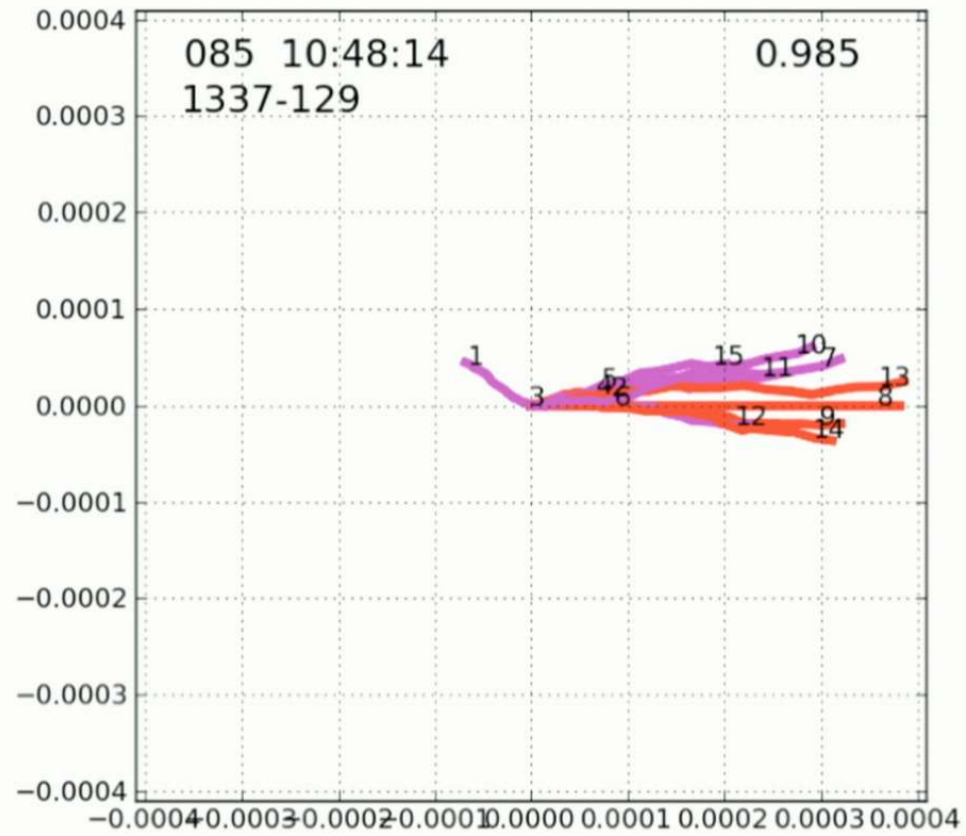
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phasing diagram



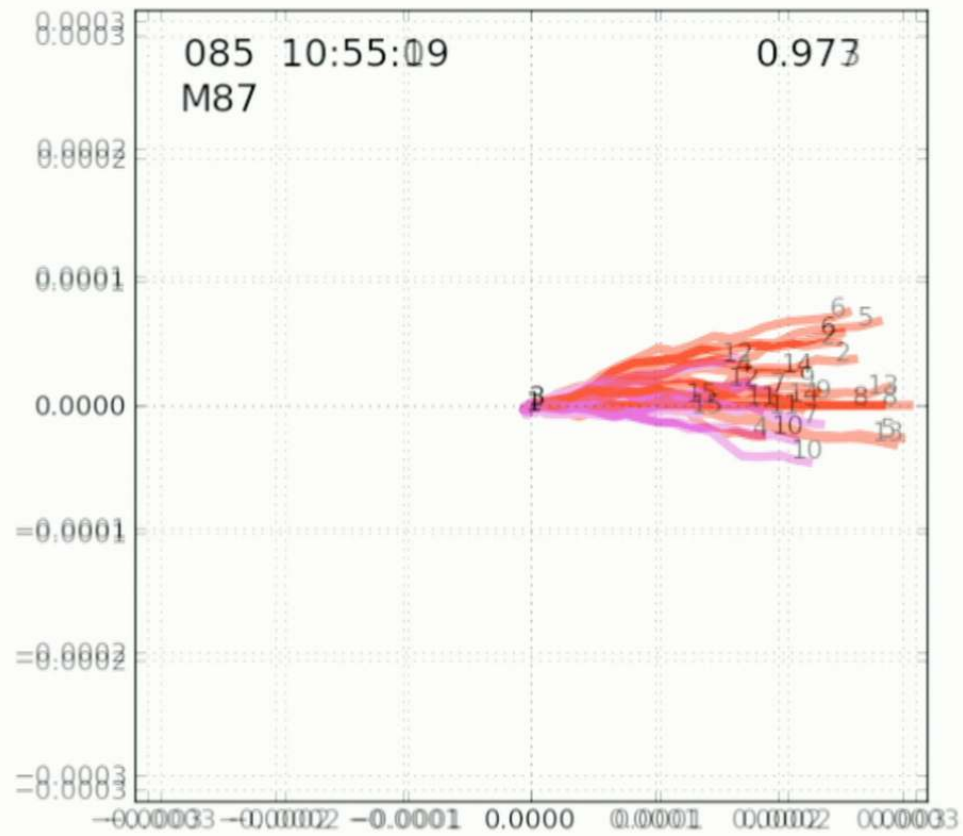
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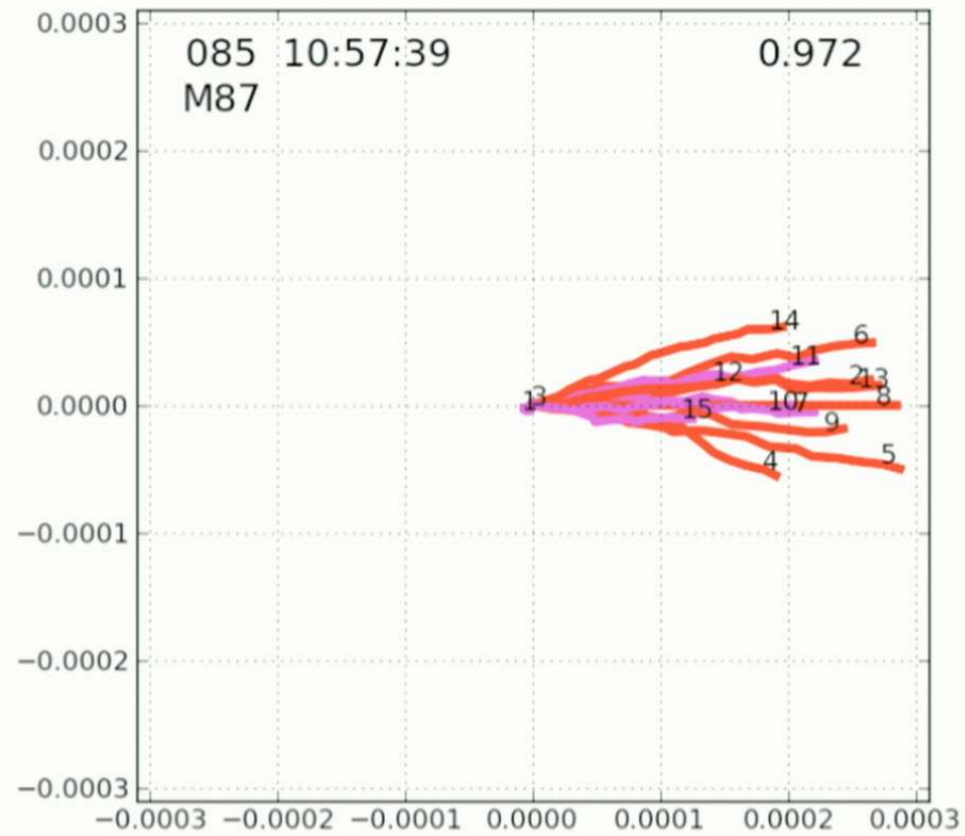
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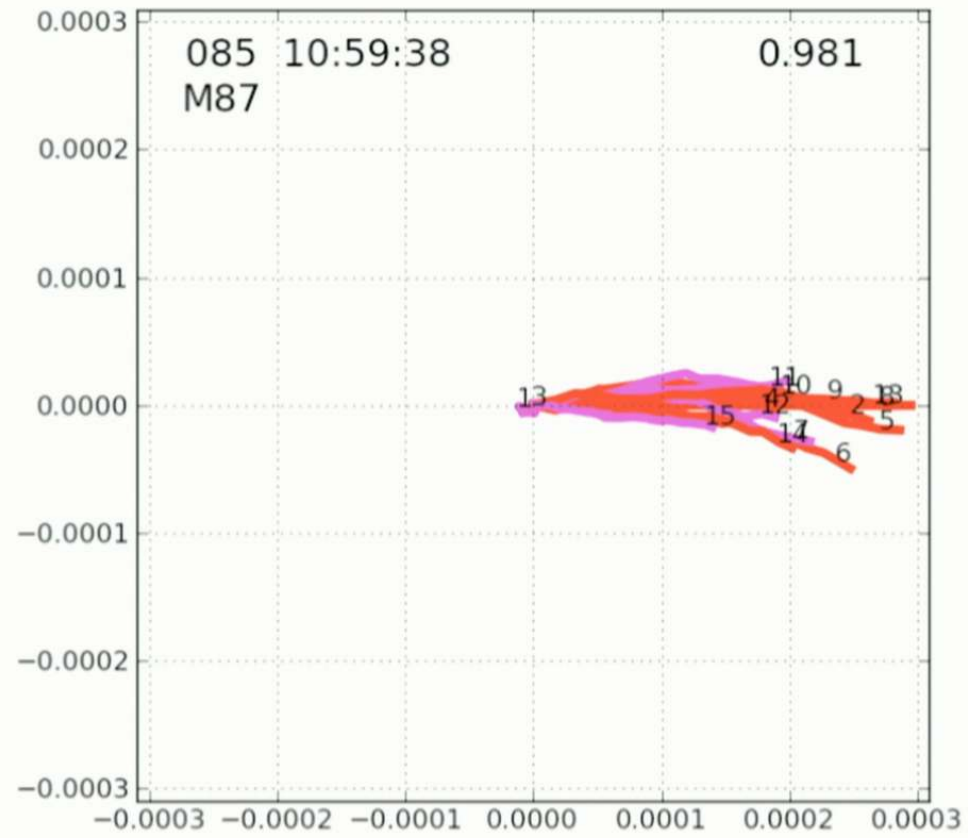
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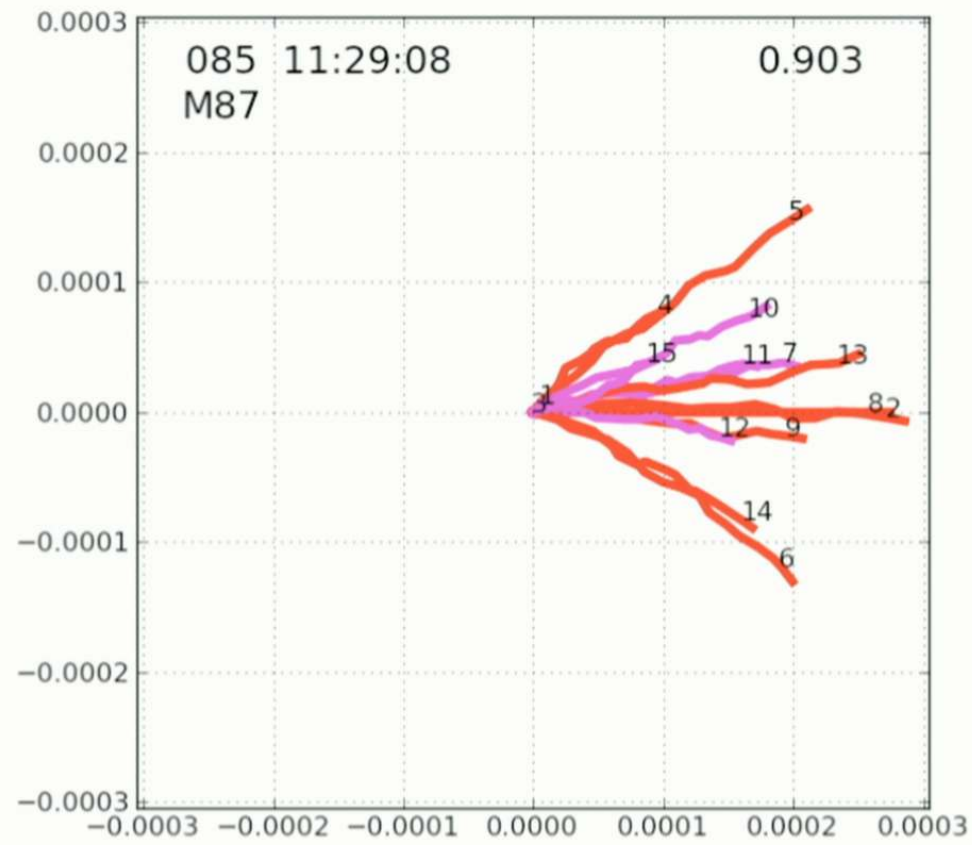
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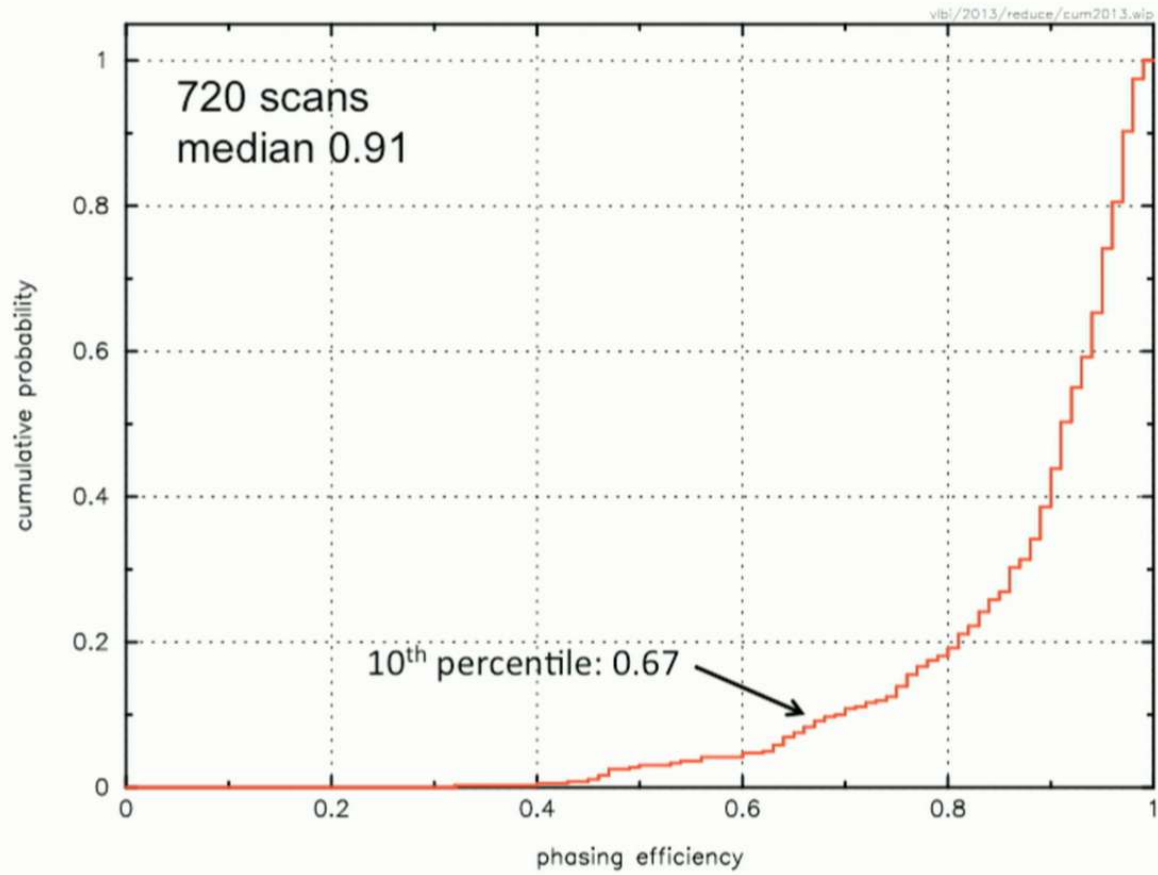


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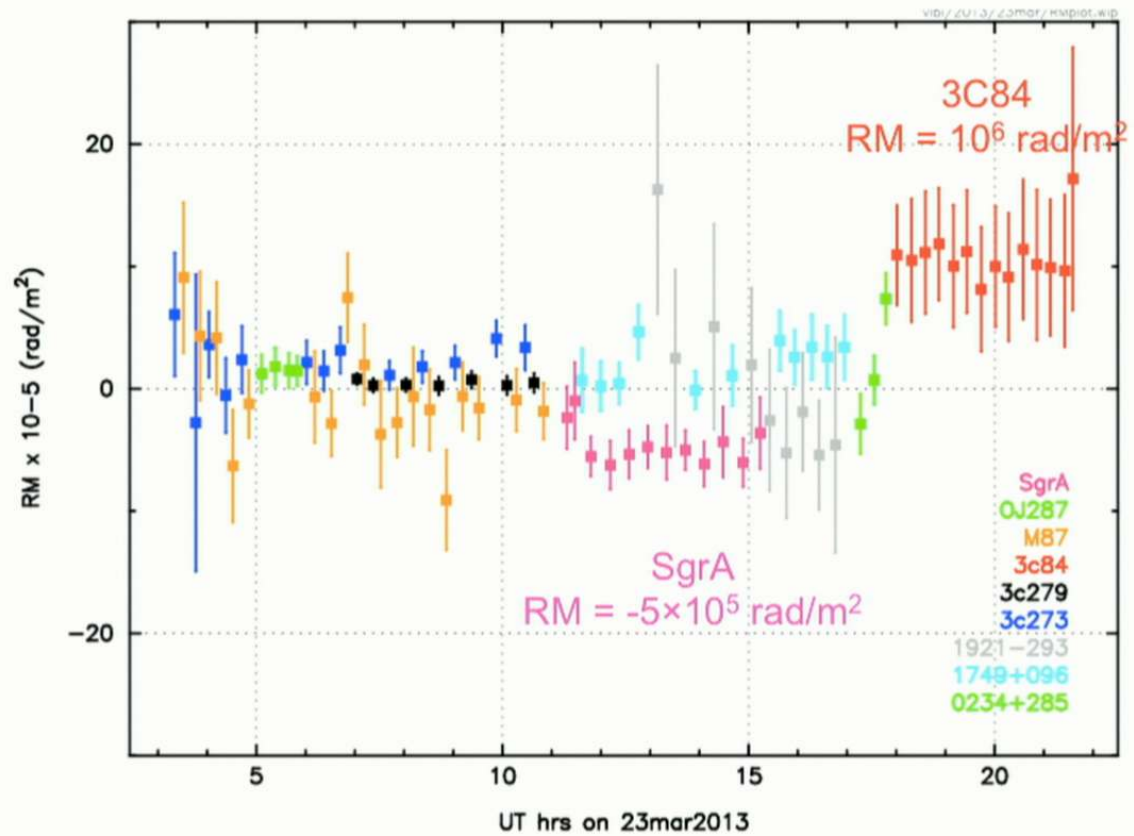
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cumulative phasing efficiency, 2013 experiment



serendipitous discovery of Faraday rotation toward 3c84 (from local CARMA data)



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March 2015

- double size of beamformer to take advantage of all the analog downconverters (16 Gb/s)
 - 2 GHz × 2 polarizations, phased sum of 8 ants
 - Berkeley has all needed iBob and BEE2 boards
 - Haystack will provide FiLa 10G boards to convert from VSI to VDIF for Mk6 recorders
- also record 16 Gb/s from comparison antenna
 - use CARMA downconverters or standard block downconverter? R2DBE?

2016 and beyond...

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