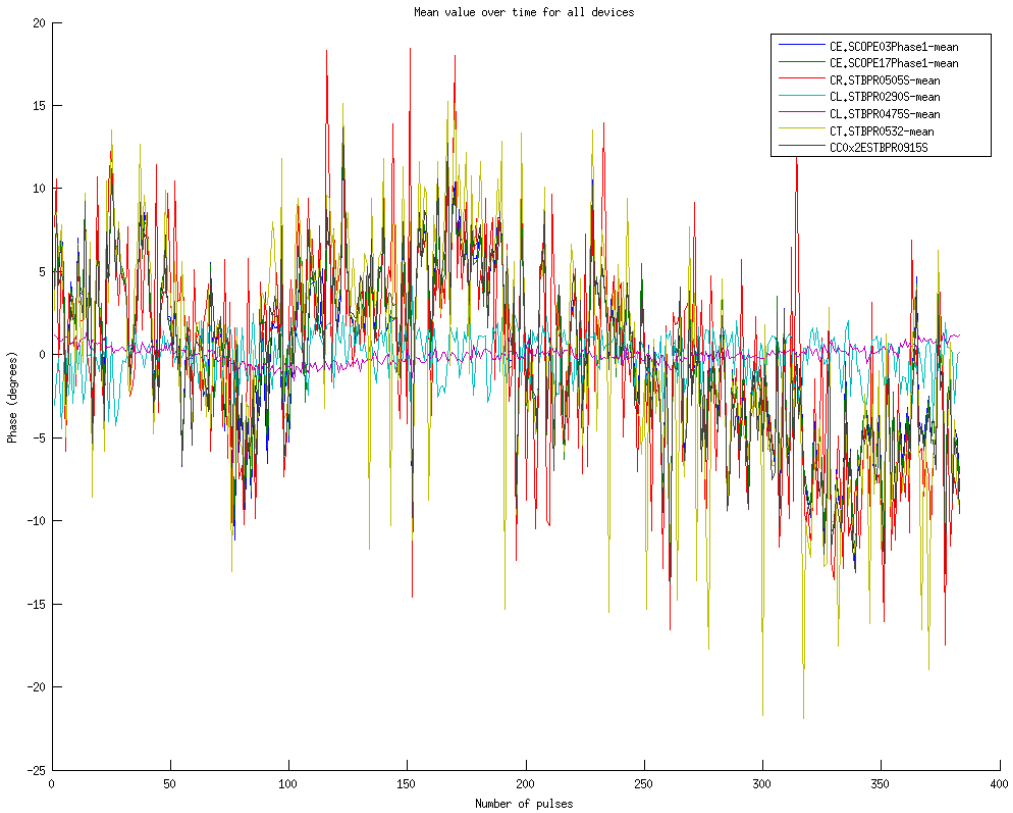
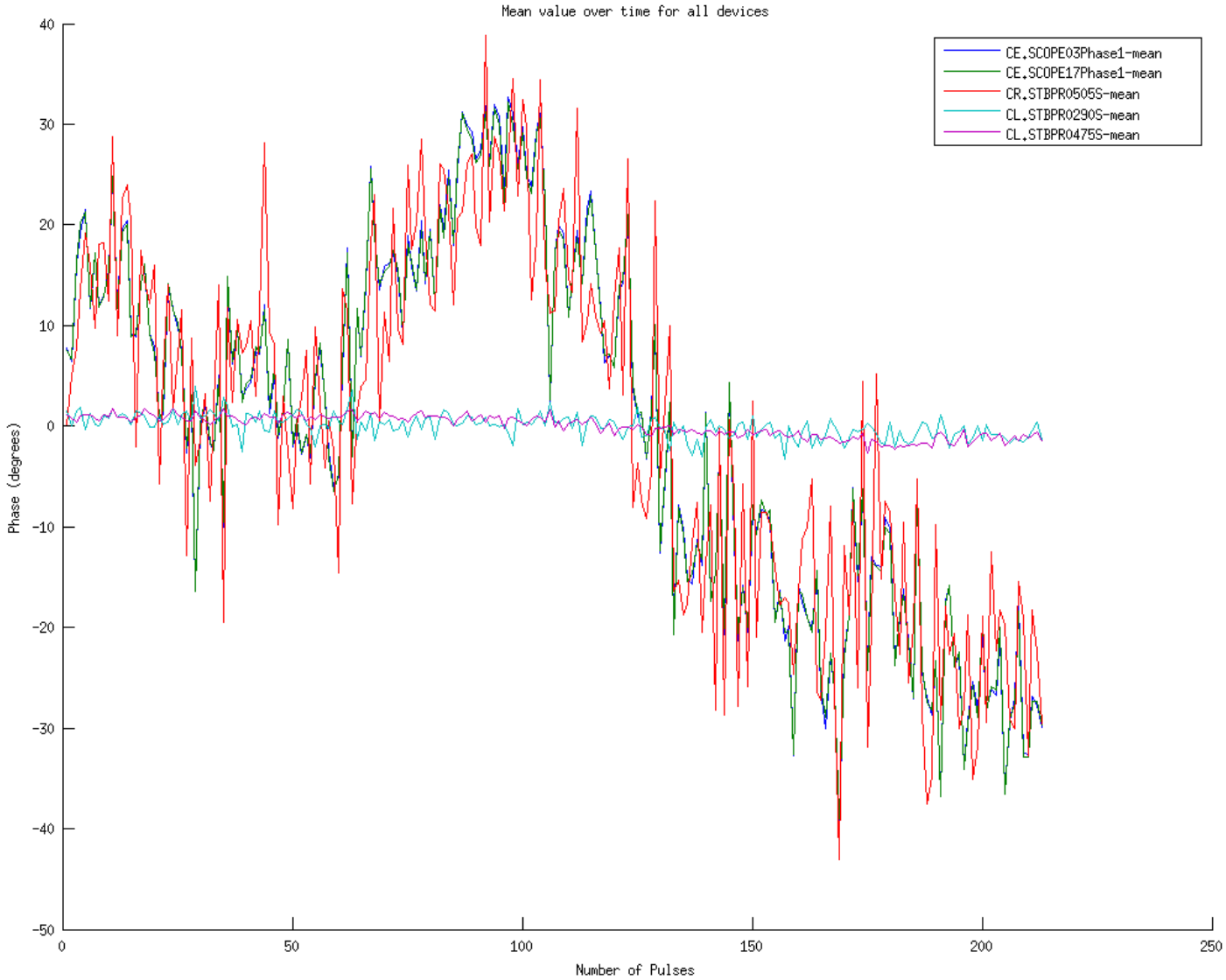
Beam Phase Measurements

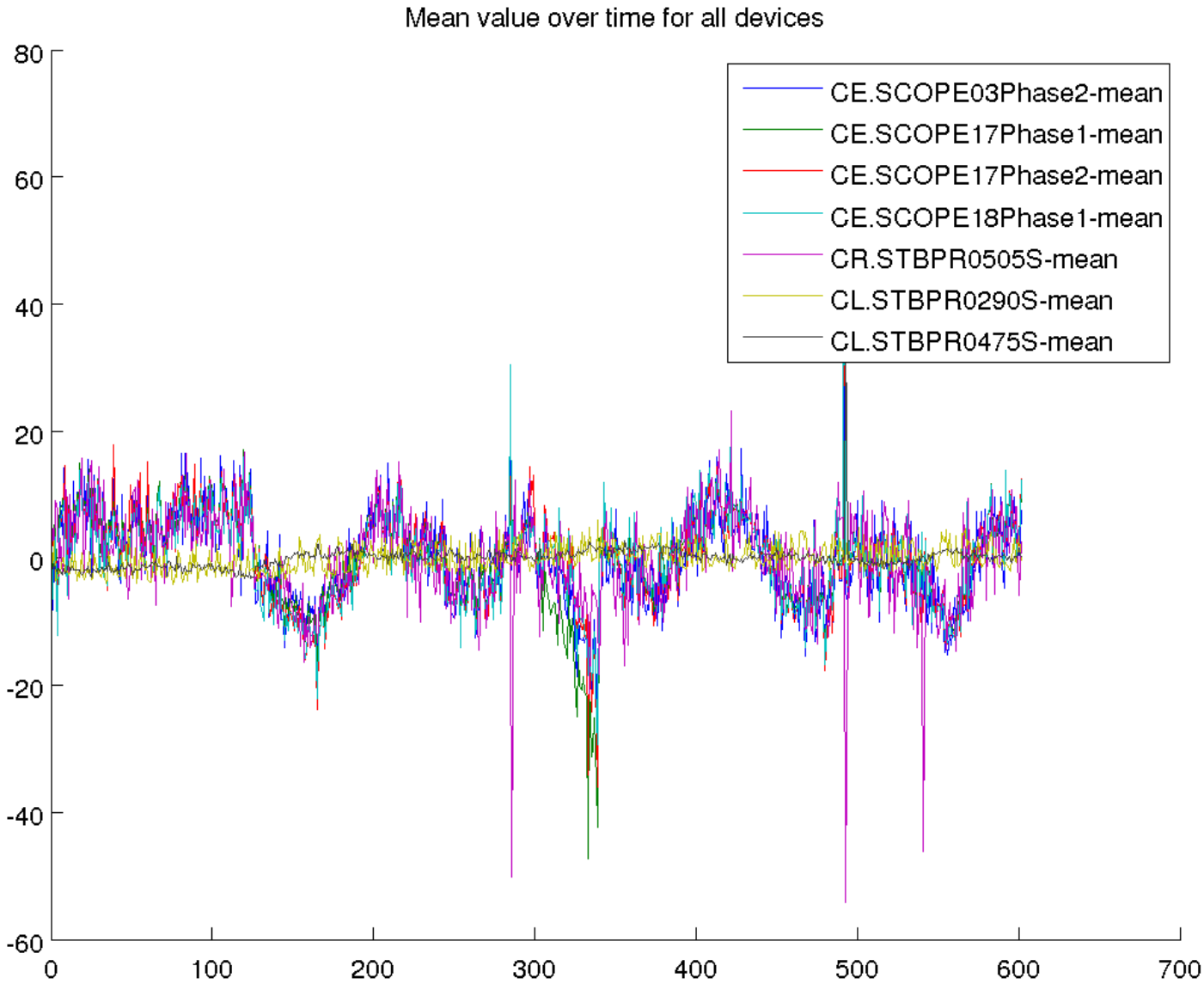
Emmanouil Ikarios

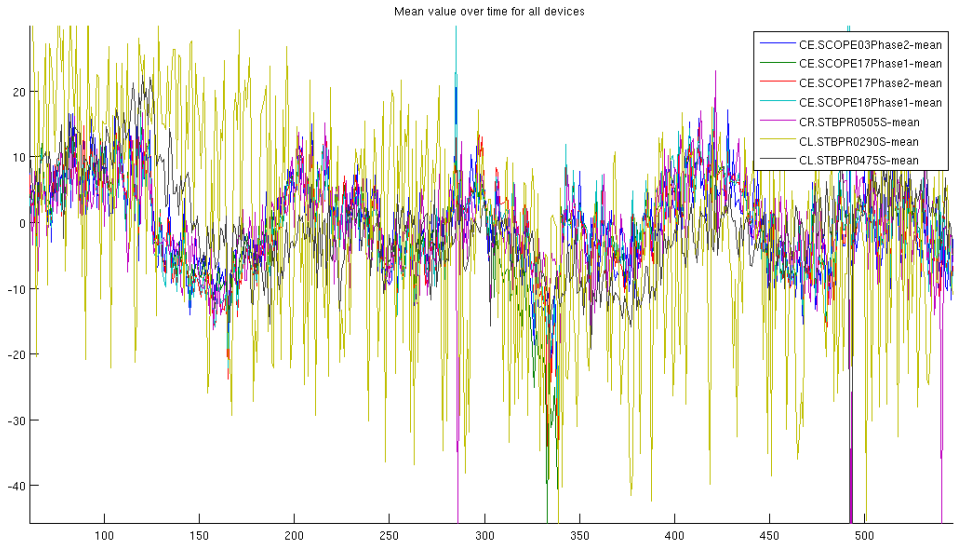
09.02.2012



- Mean value is calculated over the whole pulse
- Phase variation seems to be consistent in all devices

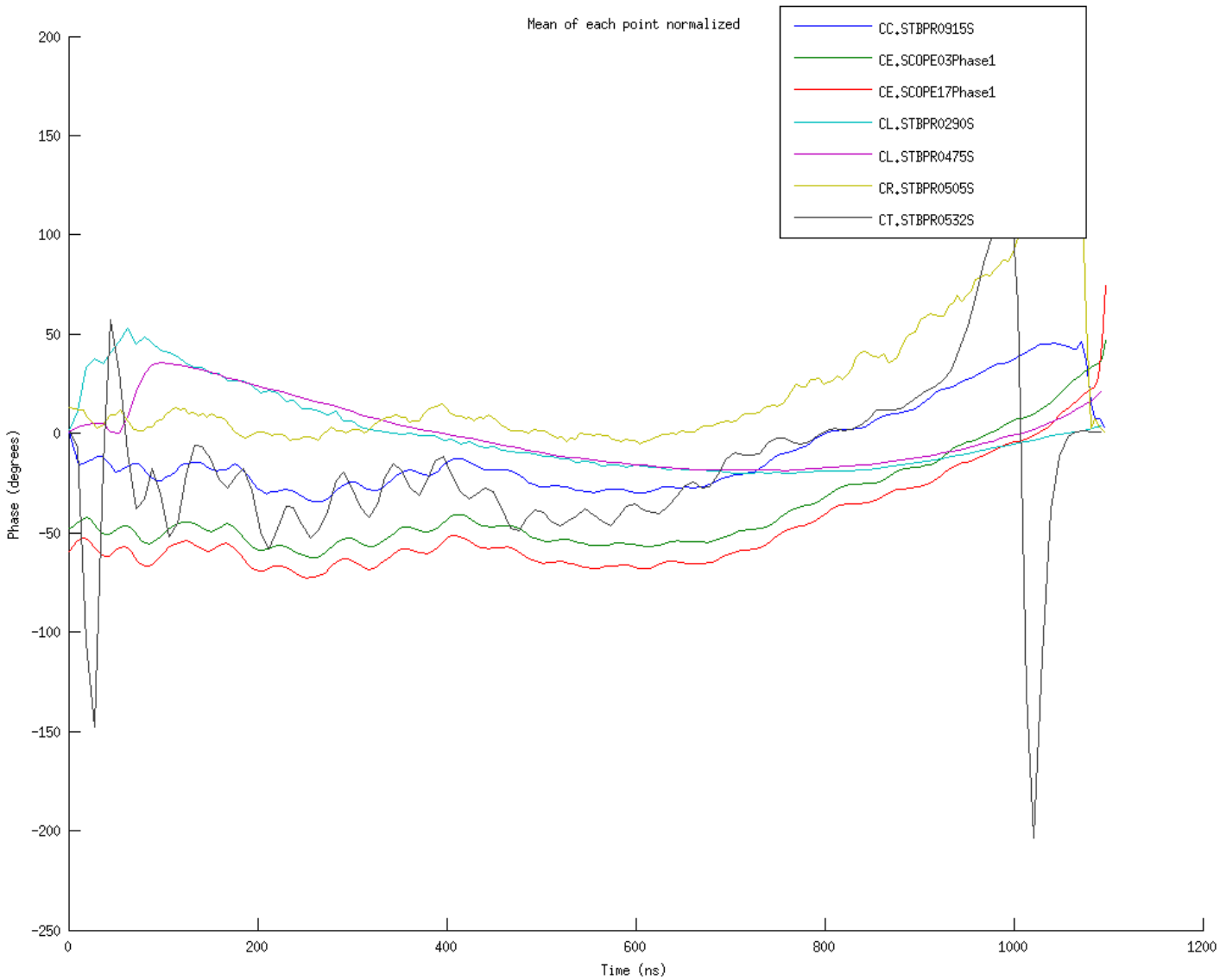

Mean value over time for all devices
CE.SCOPE03Phase1-mean
CE.SCOPE17Phase1-mean
CR.STBPR0505S-mean
CL.STBPR0290S-mean
CL.STBPR0475S-mean
Phase (degrees)
Number of Pulses
40
30
20
10
0
-10
-20
-30
-40
-50
0
50
100
150
200
250

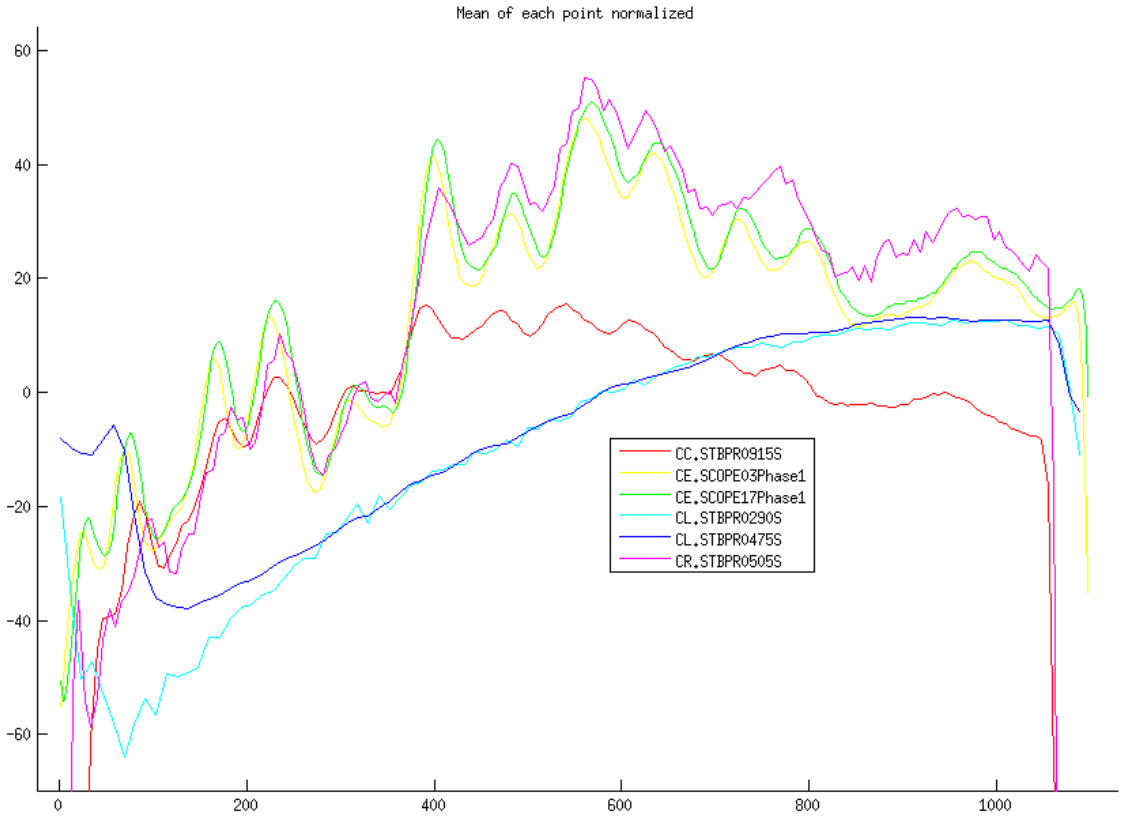

Mean value over time for all devices
CE.SCOPE03Phase2-mean
CE.SCOPE17Phase1-mean
CE.SCOPE17Phase2-mean
CE.SCOPE18Phase1-mean
CR.STBPR0505S-mean
CL.STBPR0290S-mean
CL.STBPR0475S-mean
80
60
40
20
0
-20
-40
-60
0
100
200
300
400
500
600
700



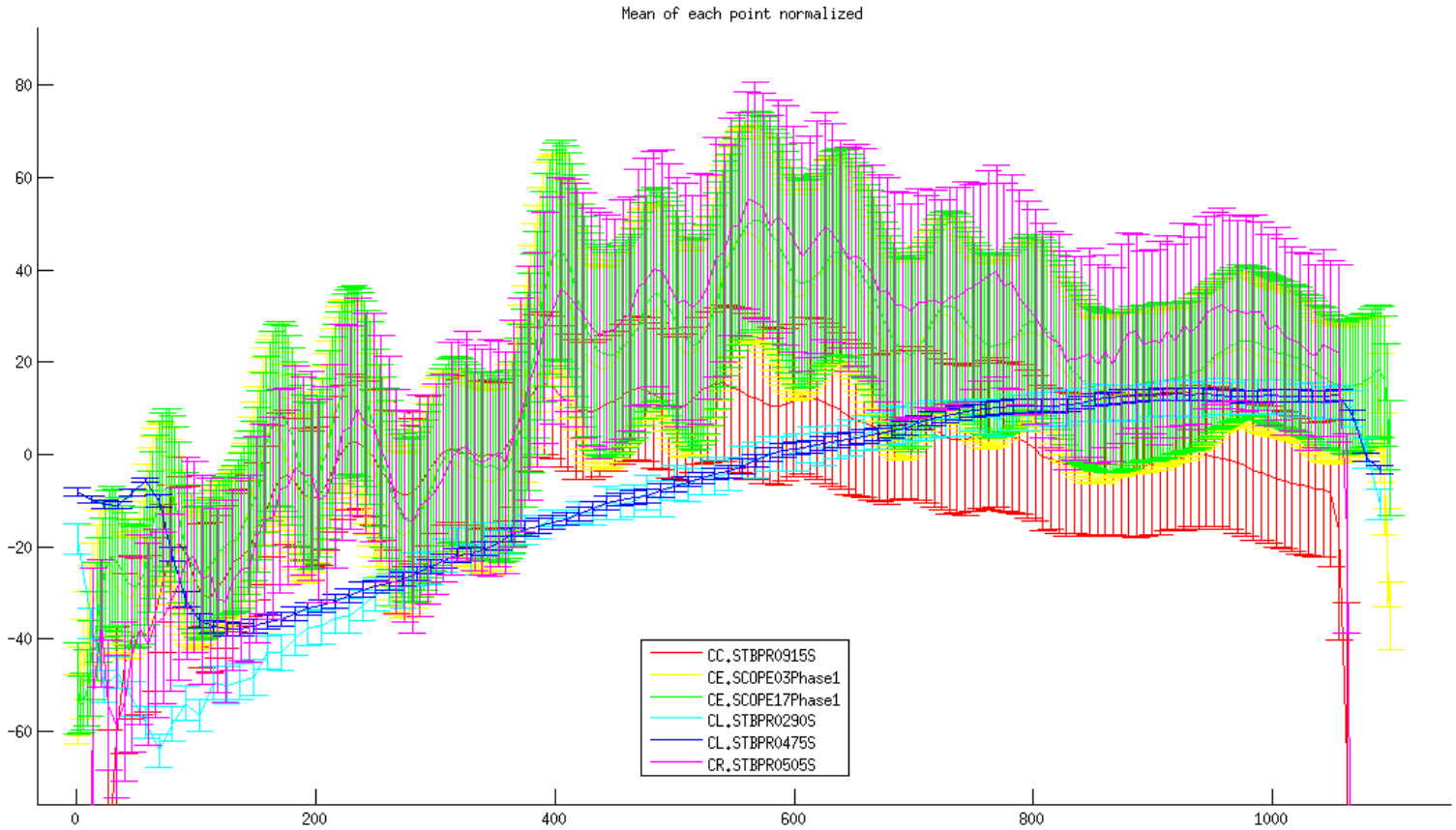
Arbitrary calibration factor to show the correlation between results from all devices

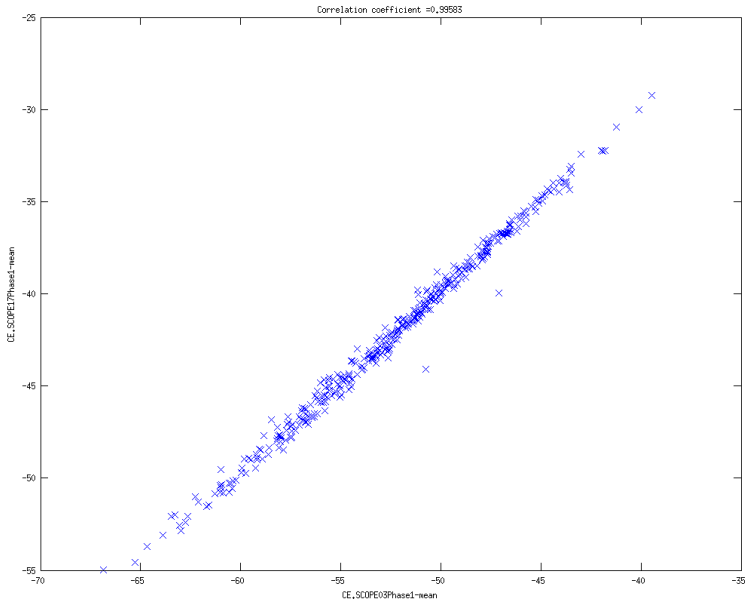
- BPR 290 (positioned after the first Klystron-buncher) seems to be very noisy $\rightarrow$ further investigation needed
- BPR 475 (positioned after the small chicane after the 2 klystrons) in accordance with the results from PETS


Mean of each point normalized
CC.STBPR0915S
CE.SCOPE03Phase1
CE.SCOPE17Phase1
CL.STBPR0290S
CL.STBPR0475S
CR.STBPR0505S
CT.STBPR0532S
Phase (degrees)
Time (ns)
200
150
100
50
0
-50
-100
-150
-200
-250
0
200
400
600
800
1000
1200

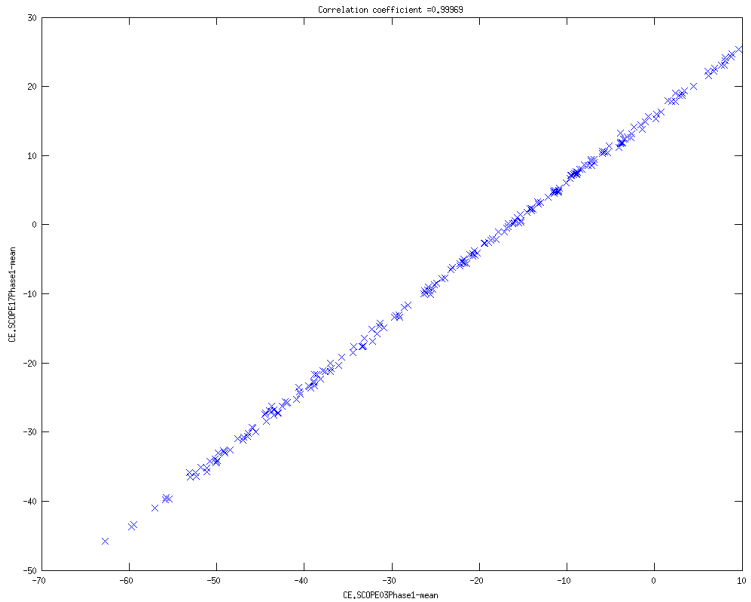


- Subtracted a value so that all lines are brought together
- Phase variation seems to be consistent in all devices


Mean of each point normalized
80
60
40
20
0
-20
-40
-60
0
200
400
600
800
1000
CC.STBPR0915S
CE.SCOPE03Phase1
CE.SCOPE17Phase1
CL.STBPR0290S
CL.STBPR0475S
CR.STBPR0505S

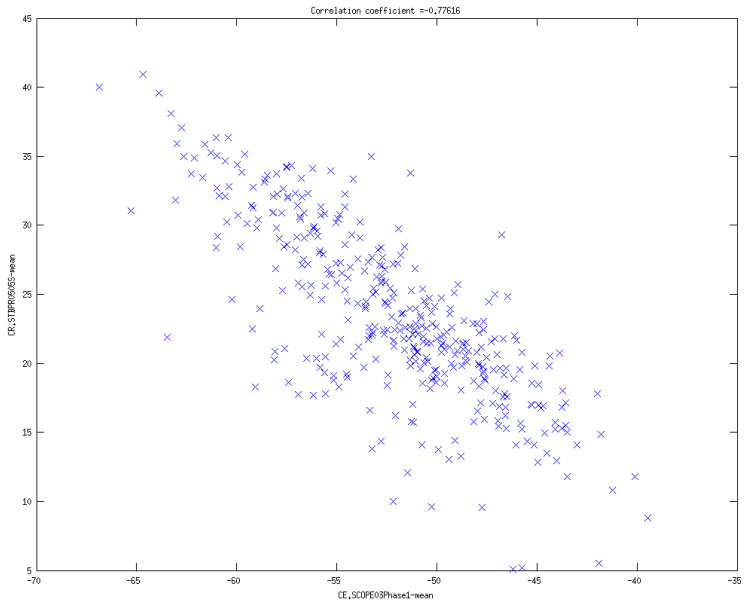


(a) 30.11.2011

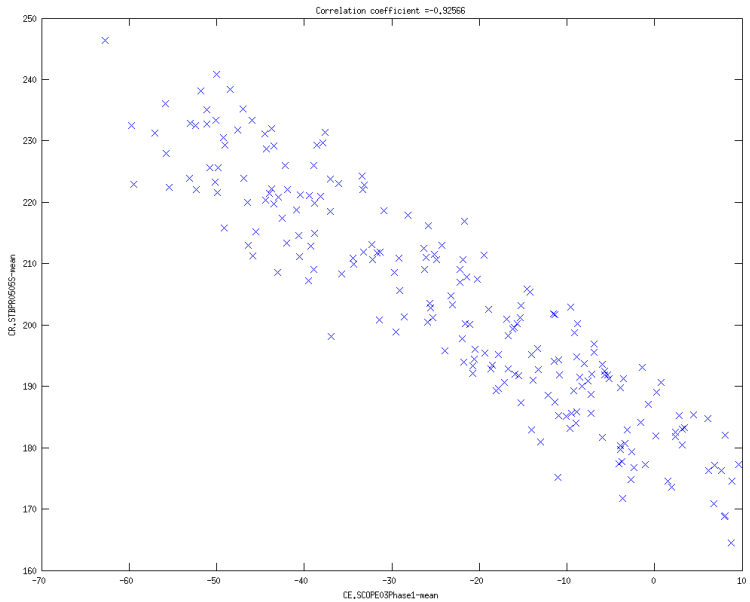


(b) 15.12.2011

Perfect correlation between the PETS devices

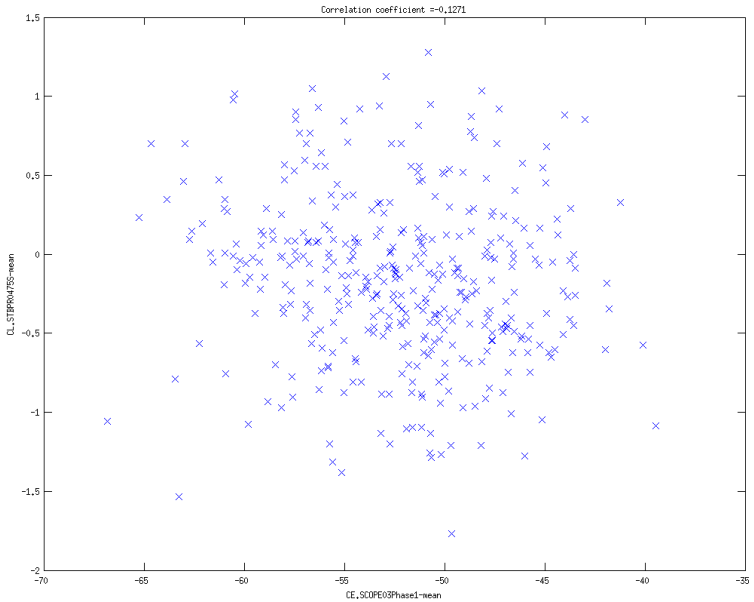


(c) 30.11.2011

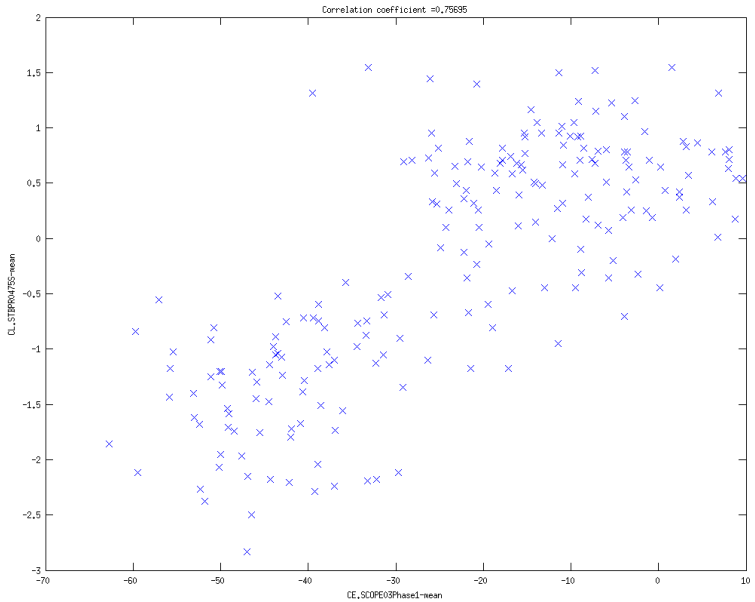


(d) 15.12.2011

Correlation with the BPR in the Combiner Ring is not always very good

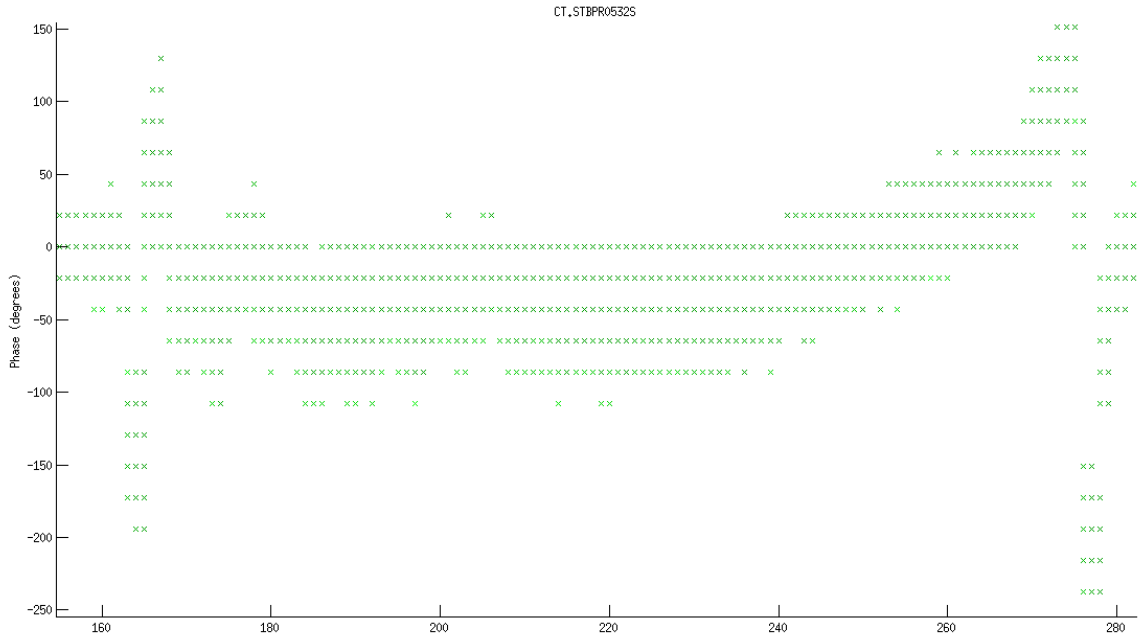


(e) 30.11.2011



(f) 15.12.2011

Situation even worse for the BPR after the small chicane

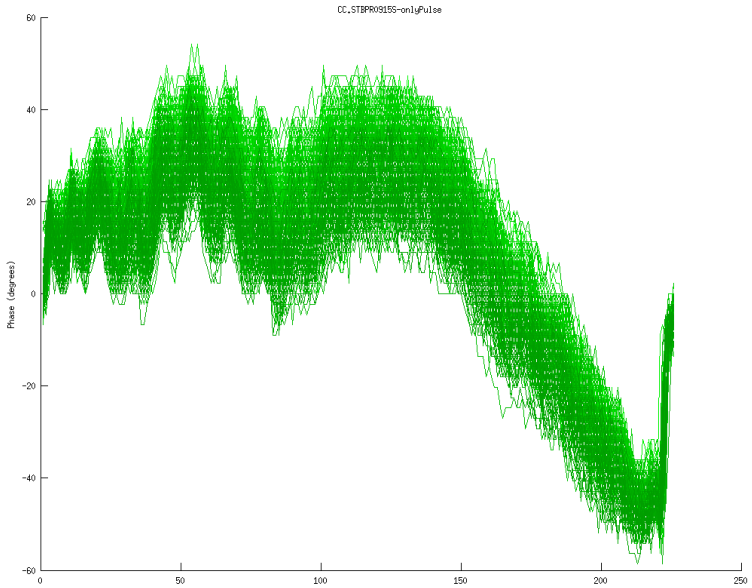


- CT.STBPR0532 seems to have very low resolution. Maybe the attenuation needs to be adjusted
- Possibility for the BPR attenuators to be in an accessible area?

- The static phase variation is more or less preserved from the injector to CLEX (is not growing) and it is 40-60 degrees at 12GHz
- Phase Variation is still very large (needs to be investigated further)

- Cross correlate with other devices, for example CT.BPI0608 to see the correlation to the beam energy
- Analysis of the noise of the electronics
- Measurement of the reference phase noise

Thank You!



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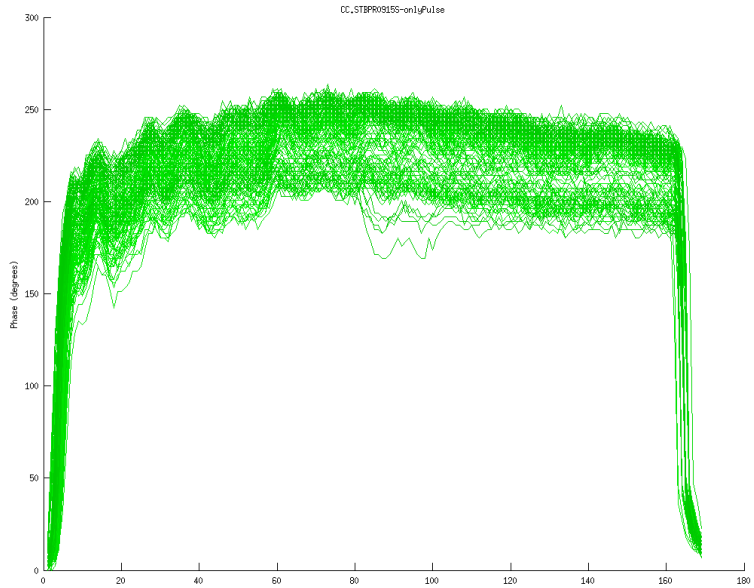

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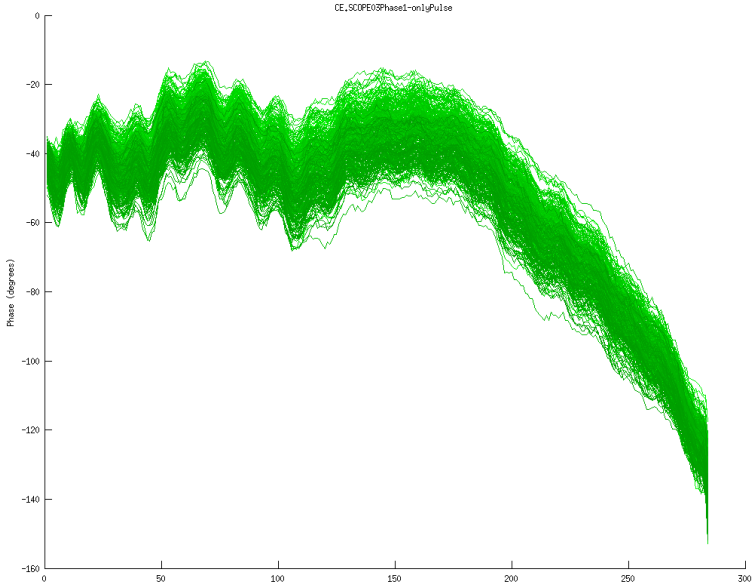

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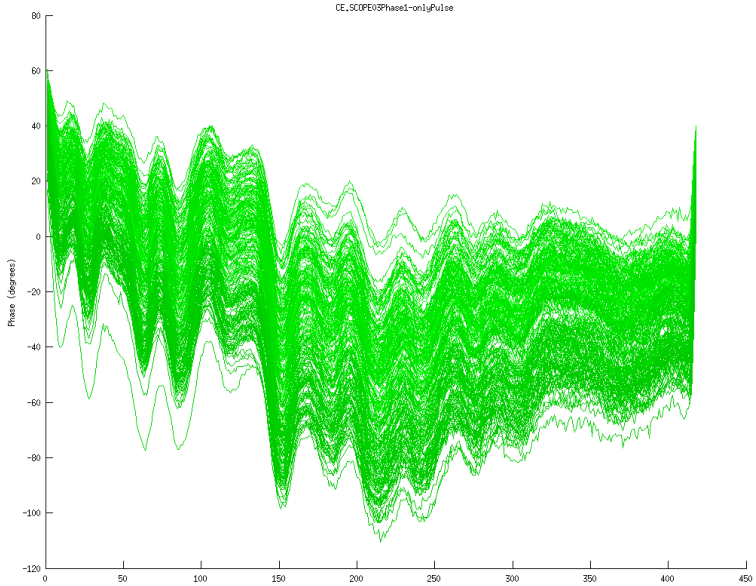

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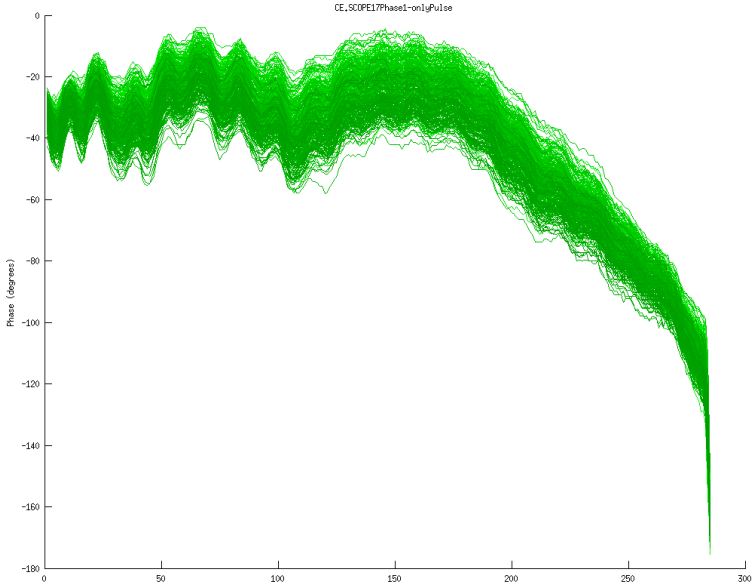

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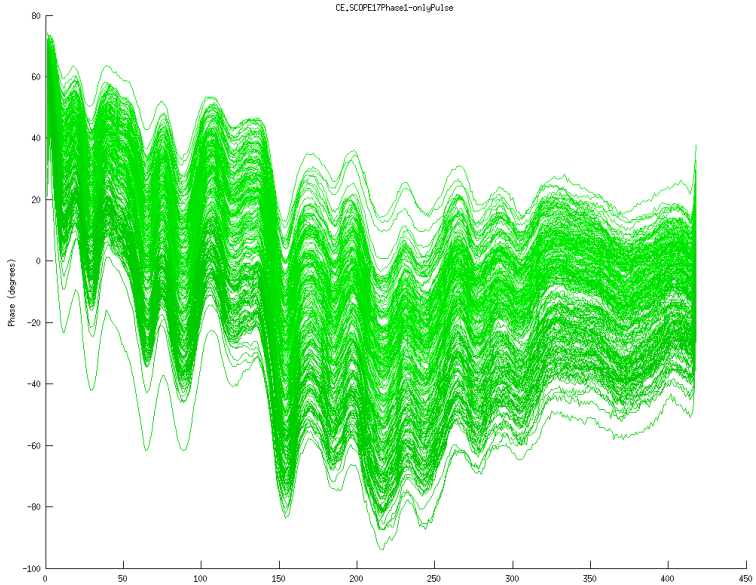

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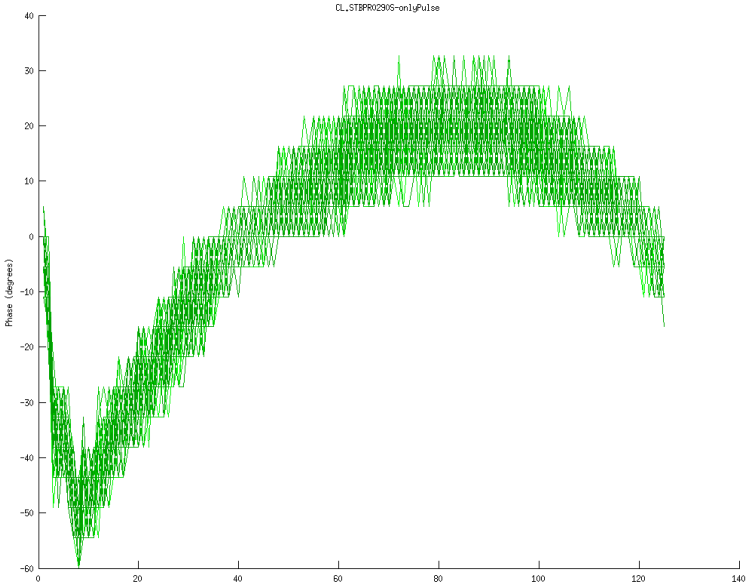

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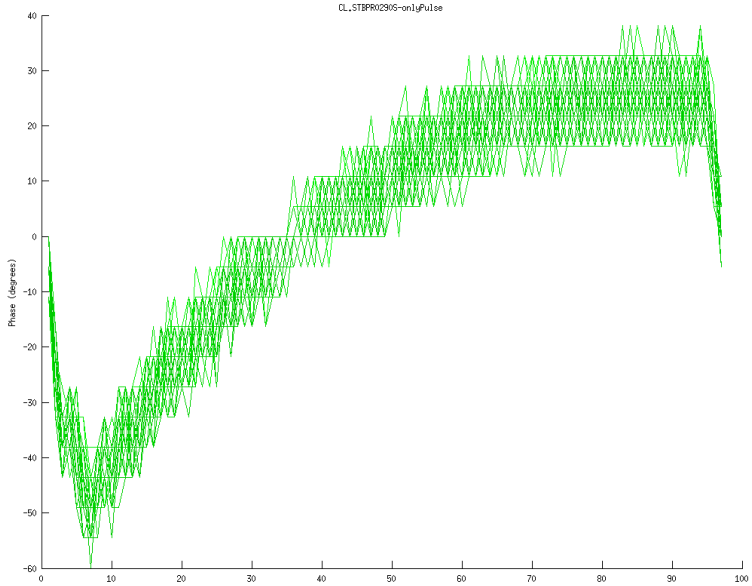

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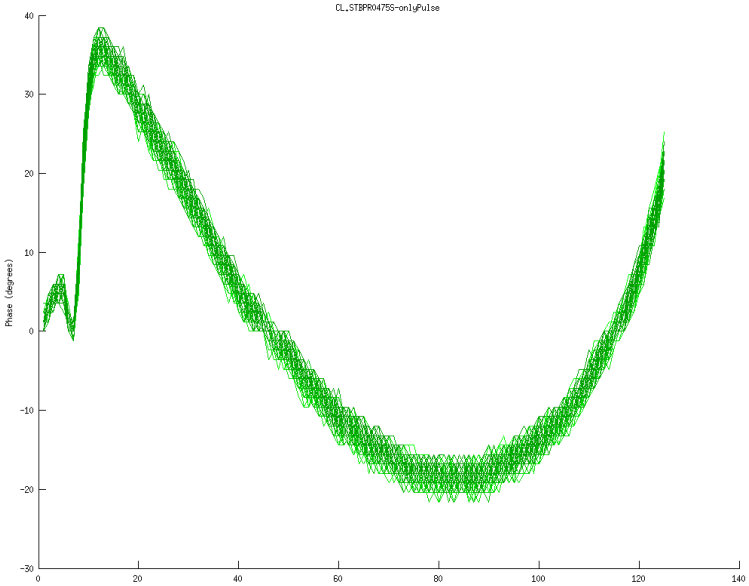

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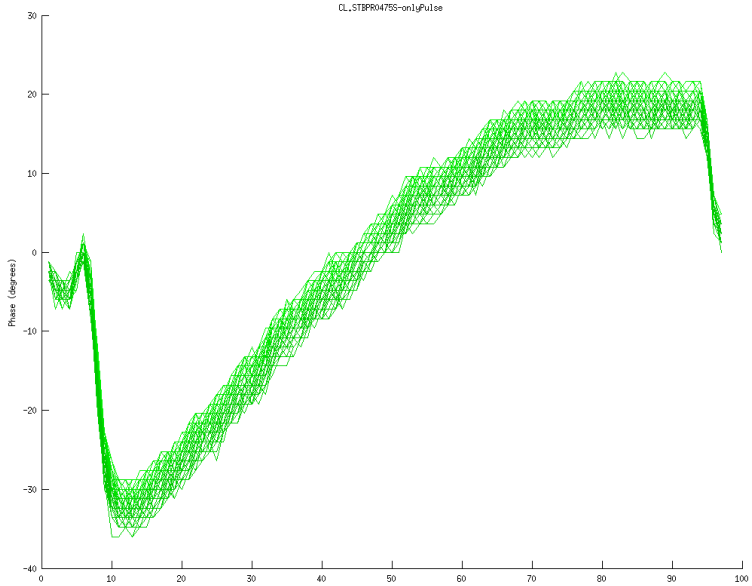

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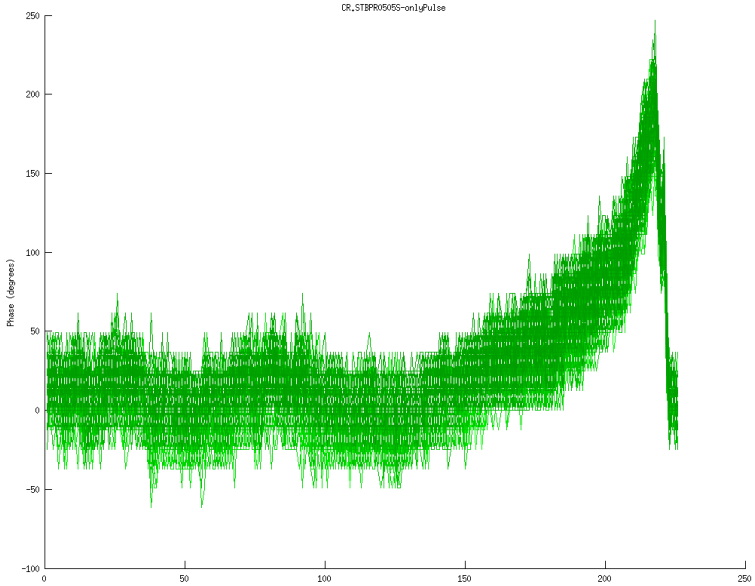

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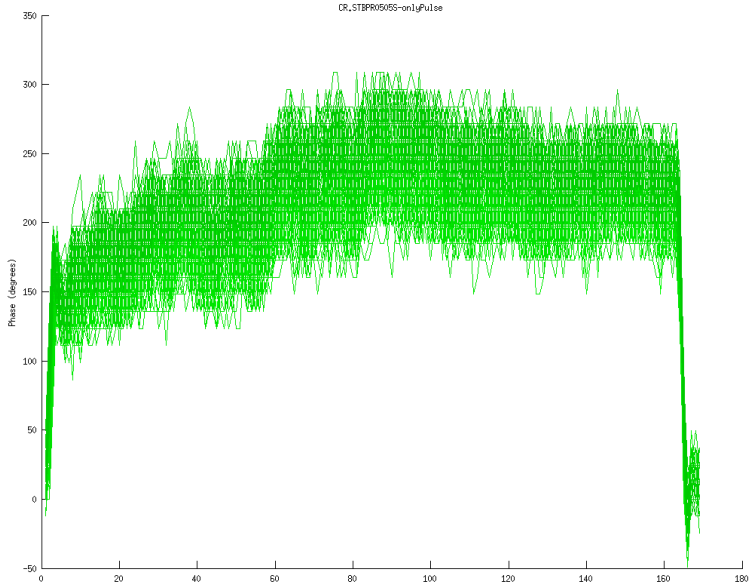

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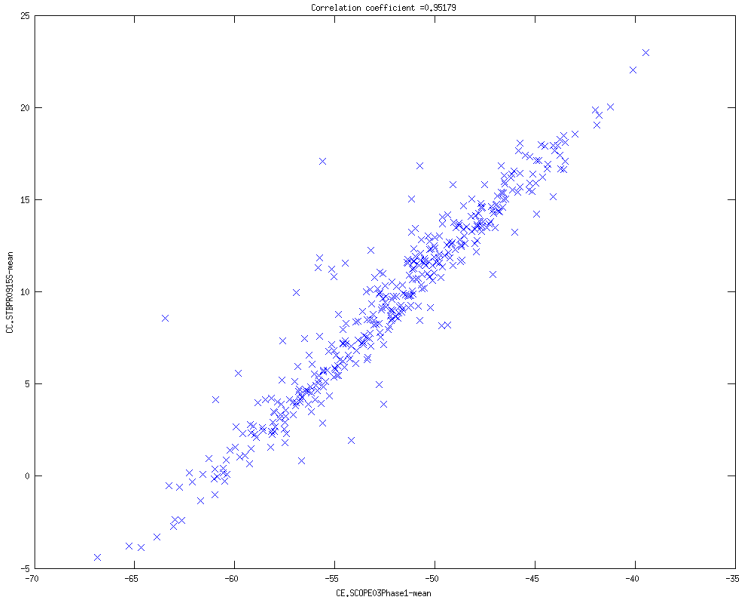

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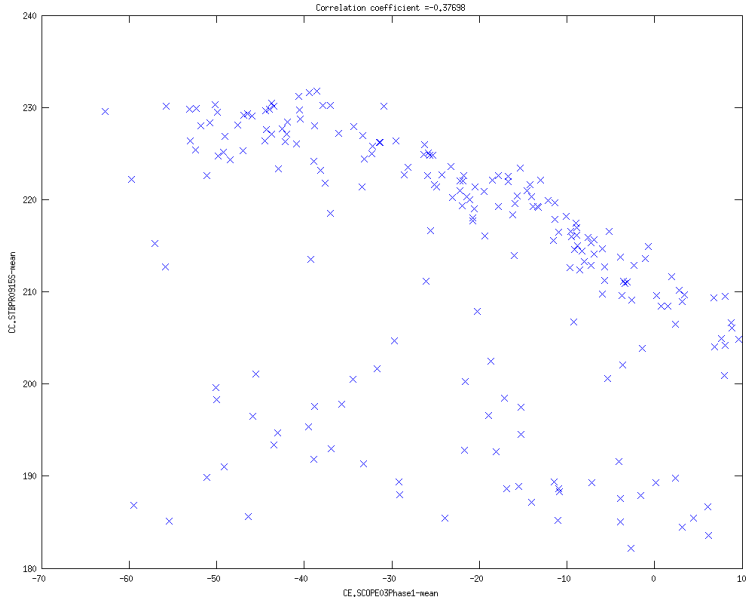

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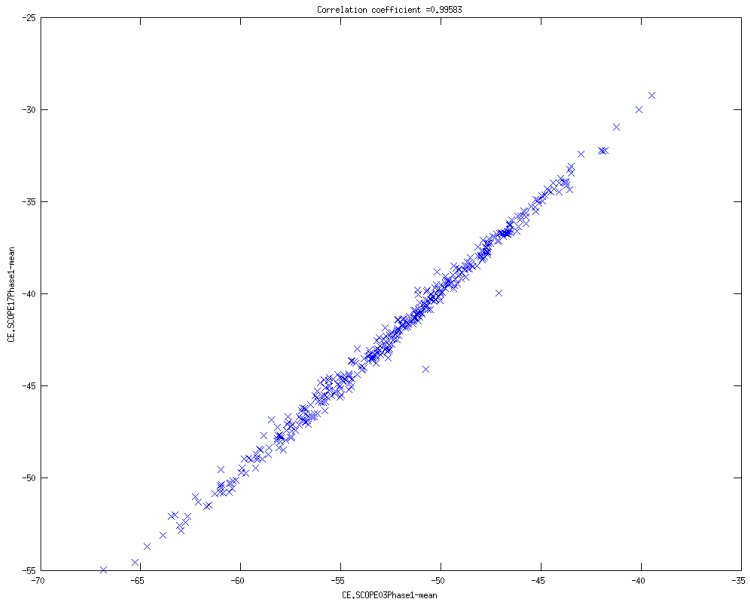

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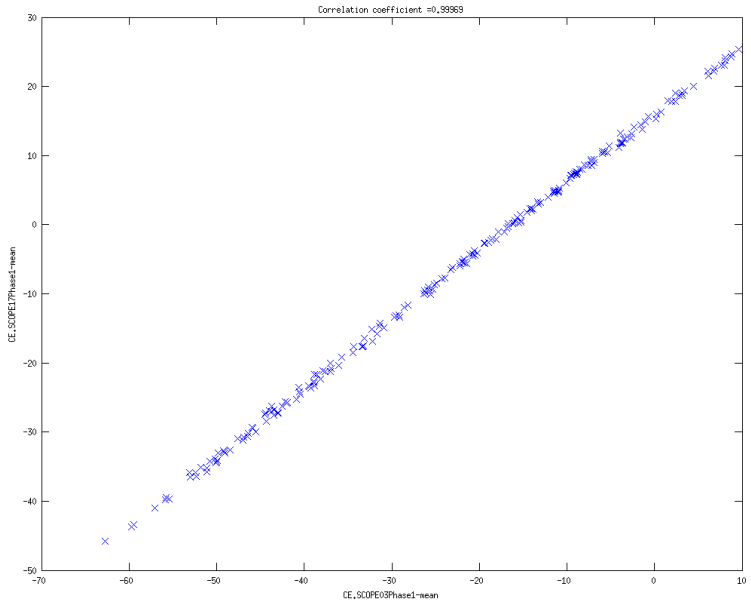

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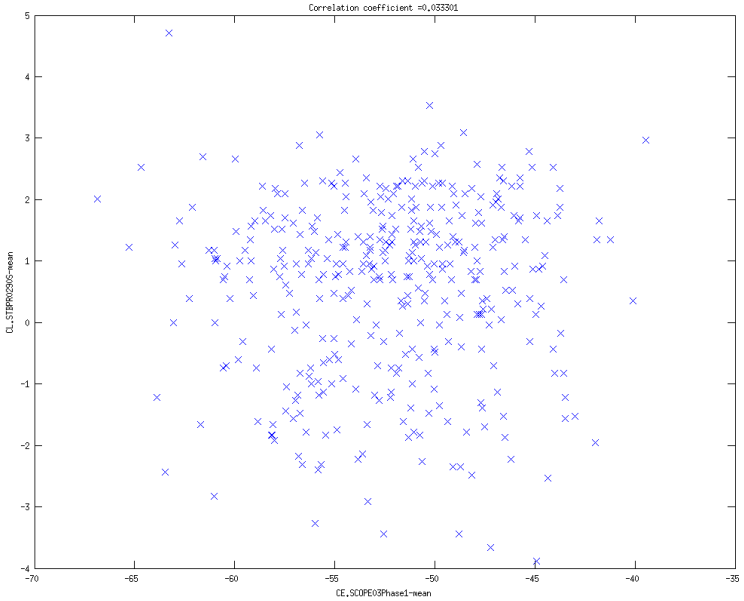

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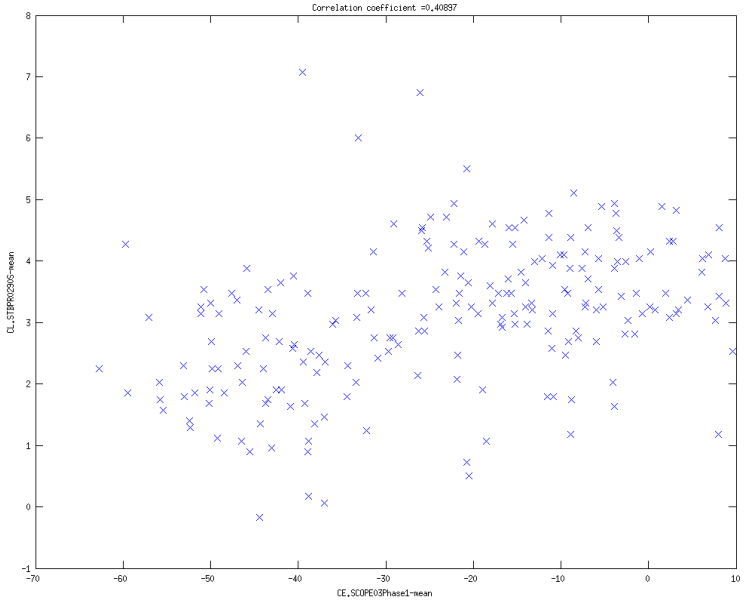

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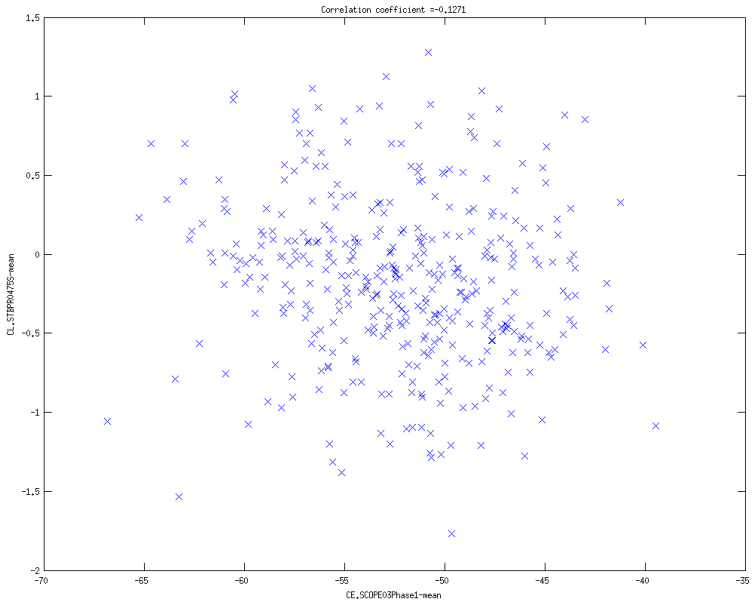

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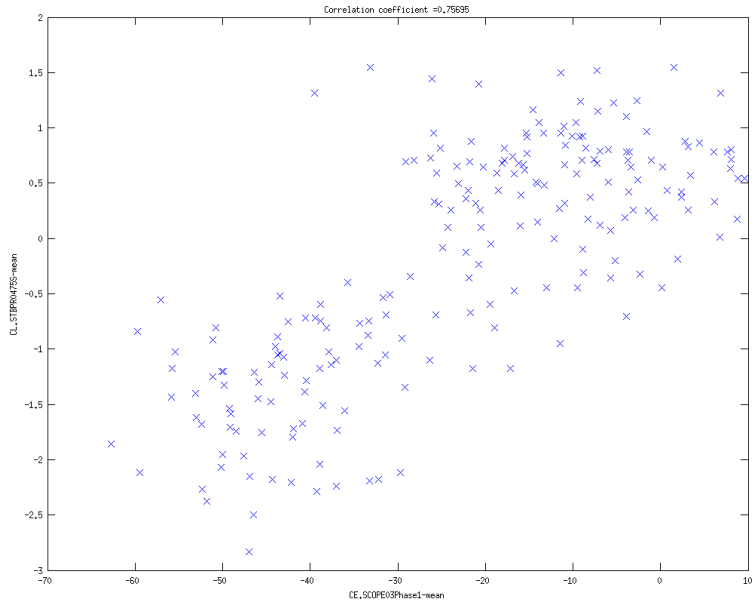

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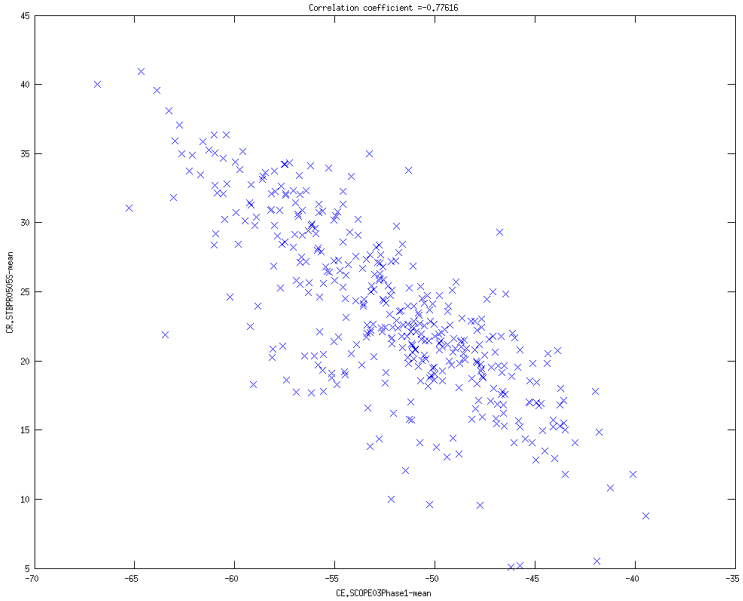

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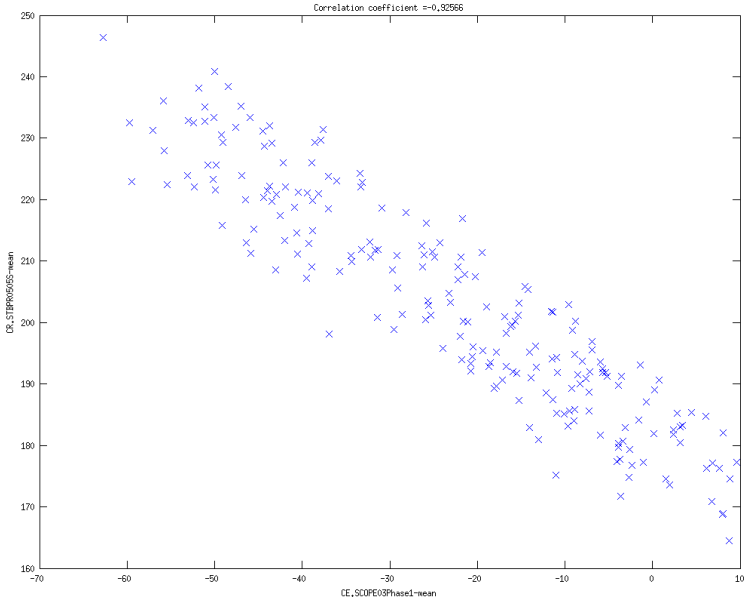

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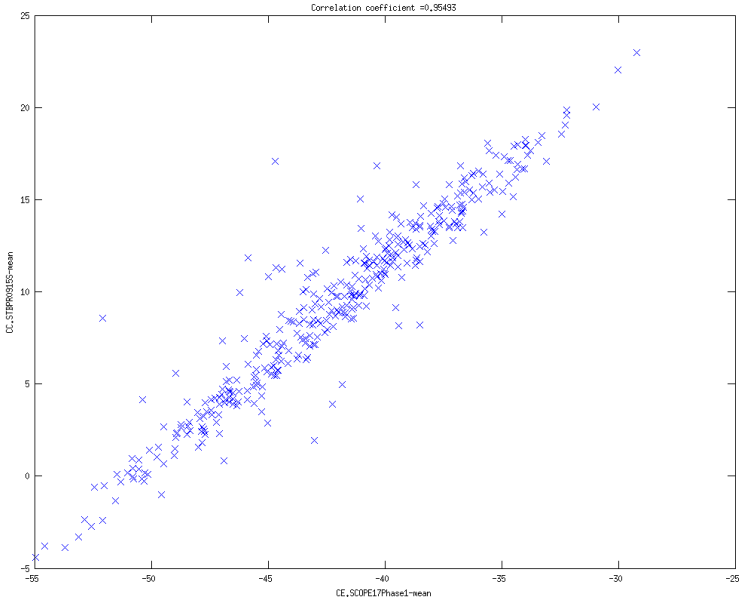

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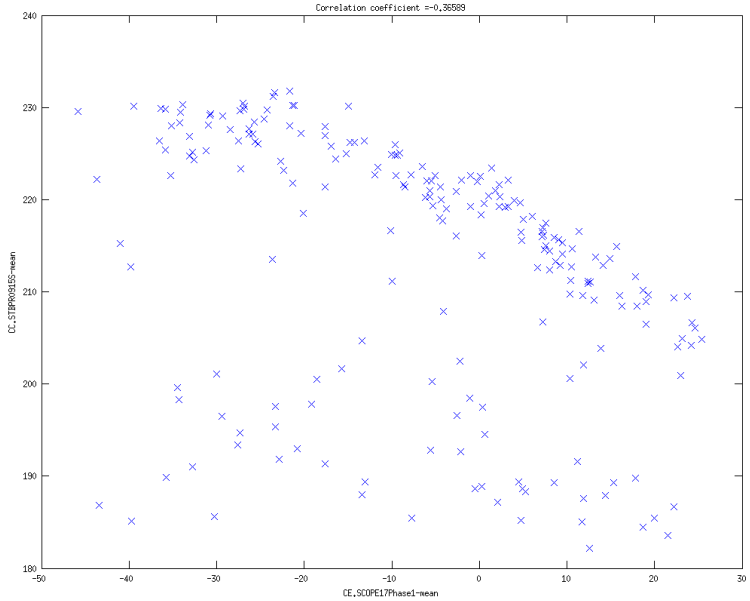

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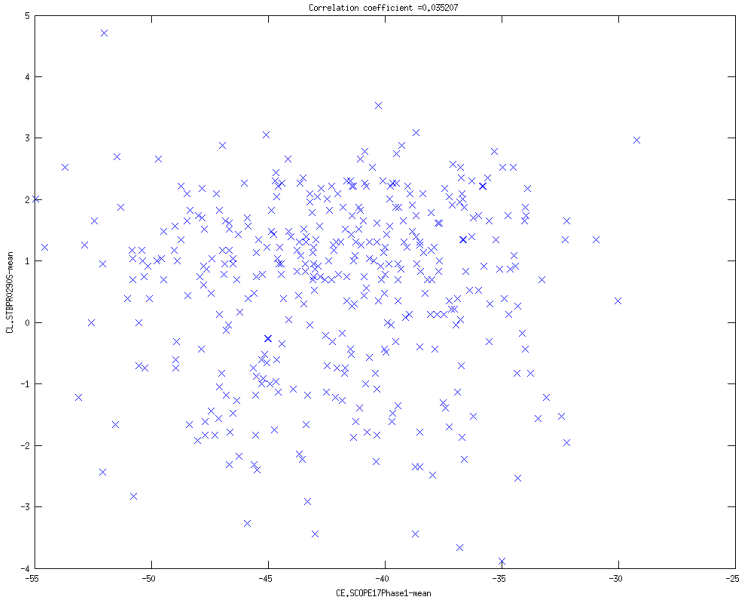

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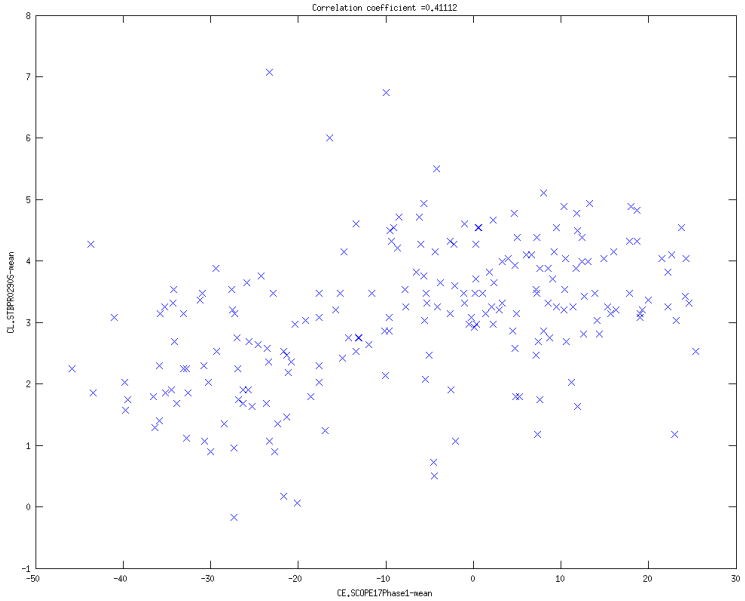

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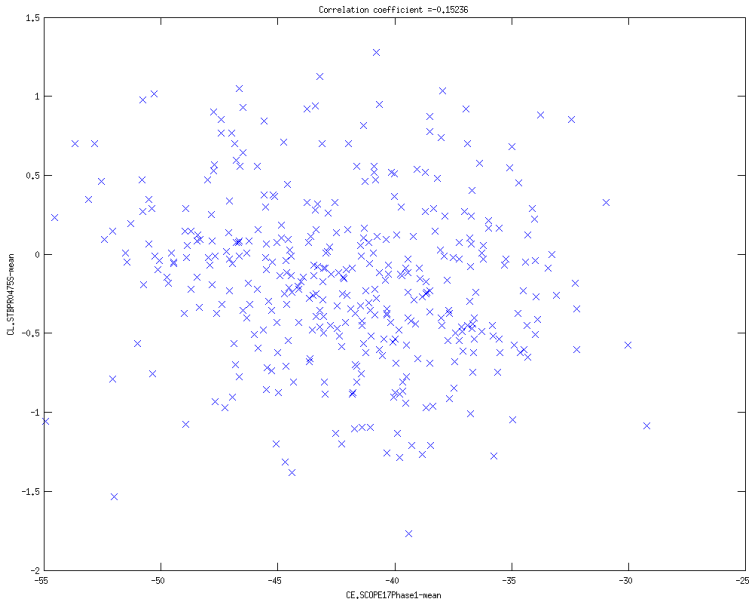

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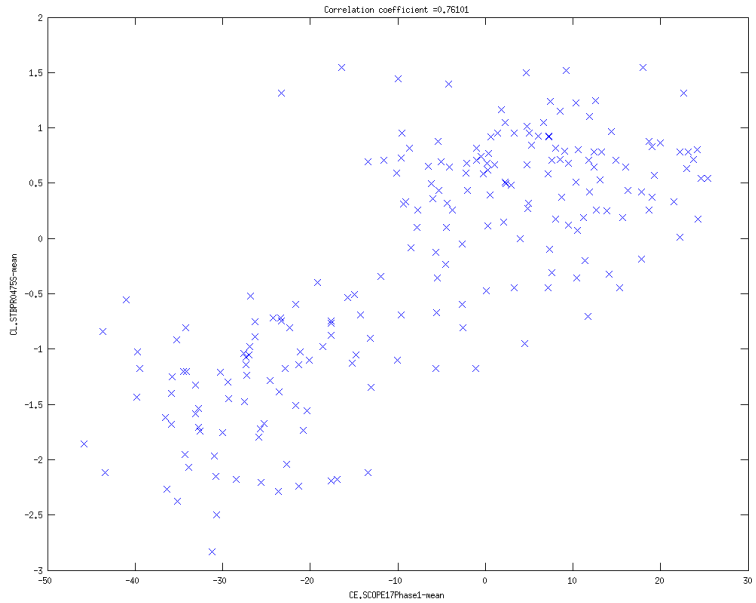

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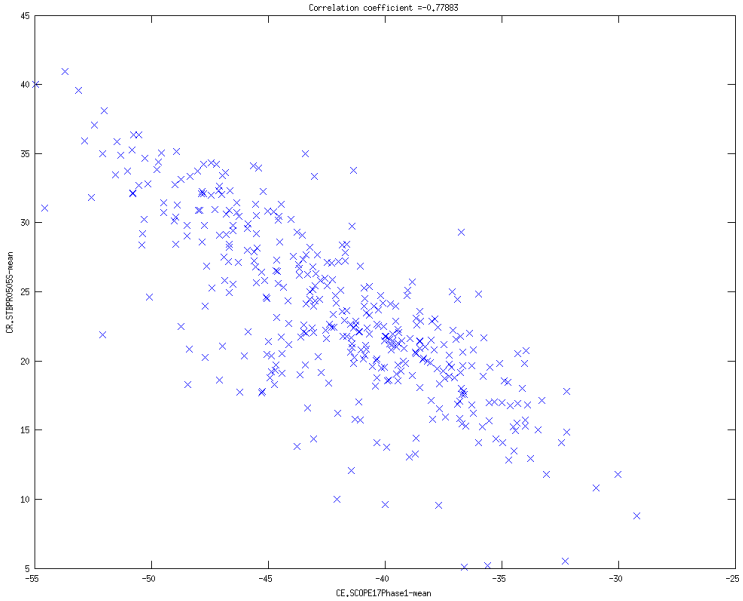

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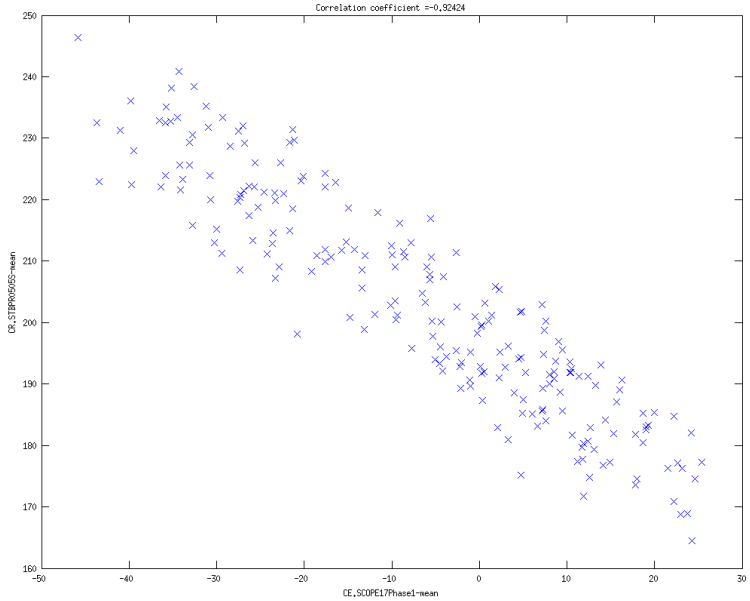

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