June 16th 2009

LCU Meeting

SLHC: Beam-Beam contribution to DA

Emanuele Laface

with the fundamental contribution of
Stephane Fartoukh
Werner Herr
Bernhard Holzer
Frank Schmidt

Parameters Considered

Nominal

Qx = 64.31 Qy = 59.32 DQ = 2

	β^* [m]	Separation [σ]	Crossing Angle [μrad]
IP1	0.55	0	285
IP2	10	5	480 (340 external)
IP5	0.55	0	285
IP8	10	0	610 (340 external)

3 Head-on + Halo collision in Alice
15 parasitic encounters per side in IR1 and IR5 before D1.
15 parasitic encounters per side in IR2 and IR8 before D1.
No magnet errors.

Parameters Considered

SLHC

Qx = 63.31 Qy = 60.32 DQ = 2

	β^* [m]	Separation [σ]	Crossing Angle [μrad]
IP1	0.30	0	410
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There are two switches:

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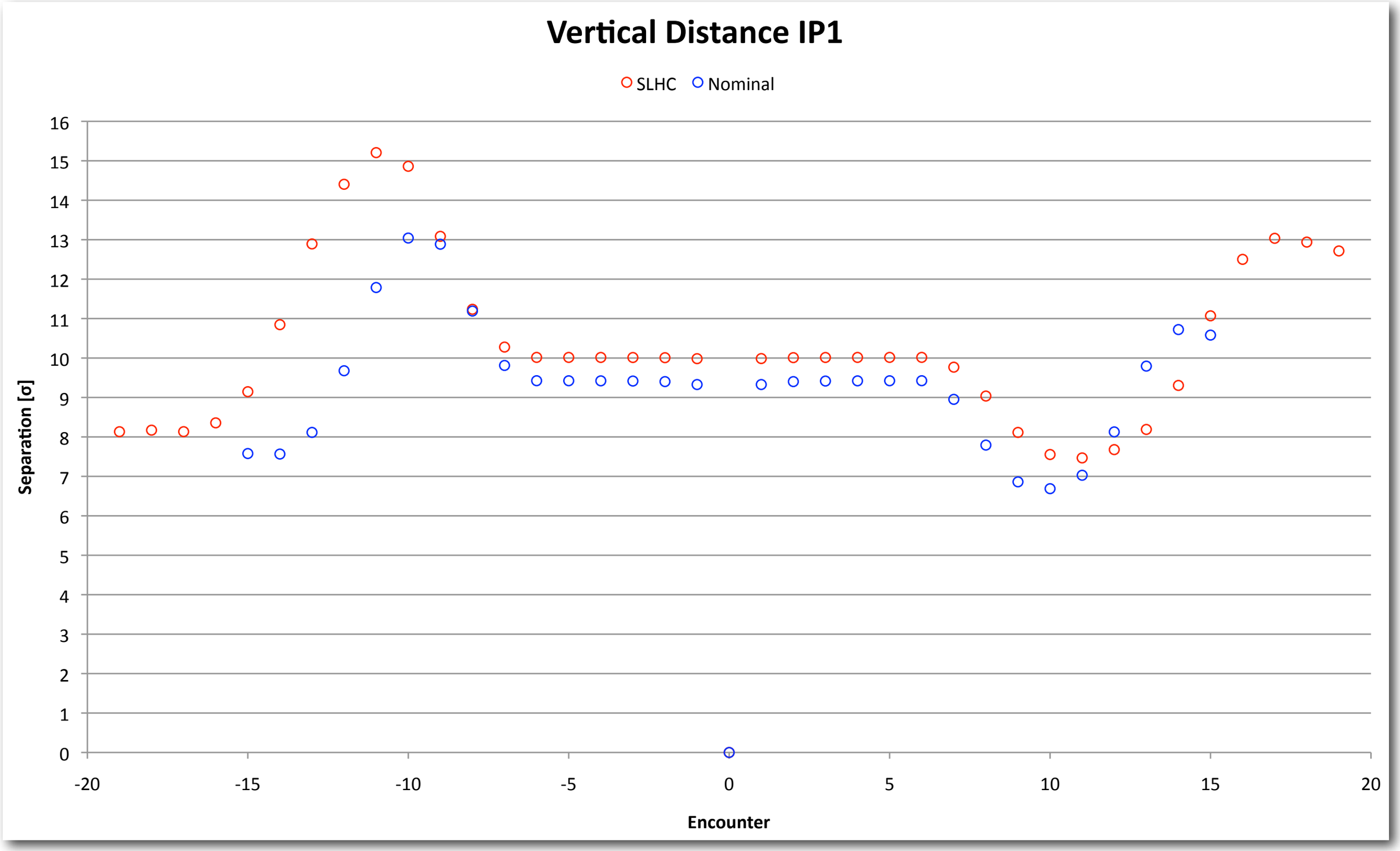
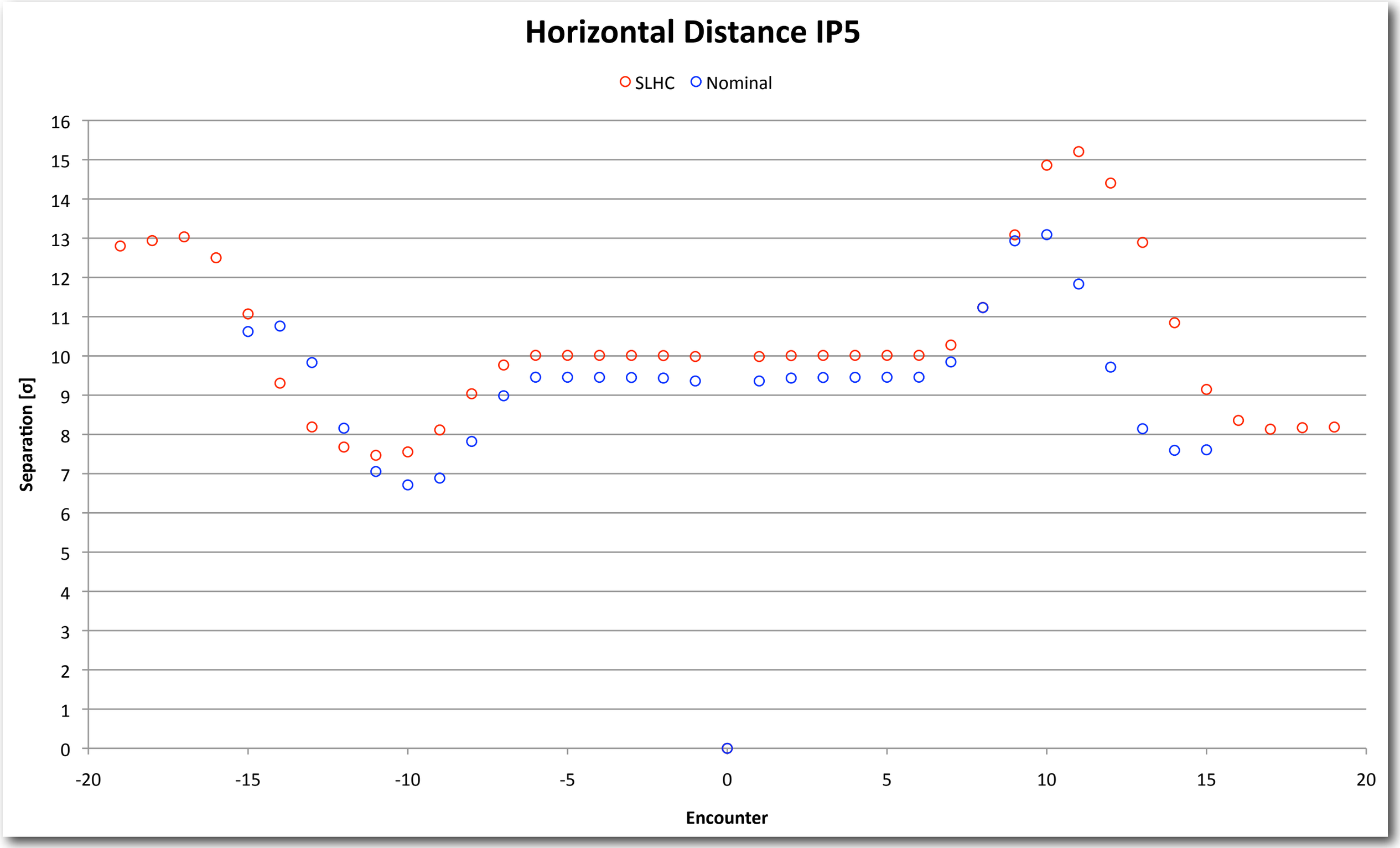
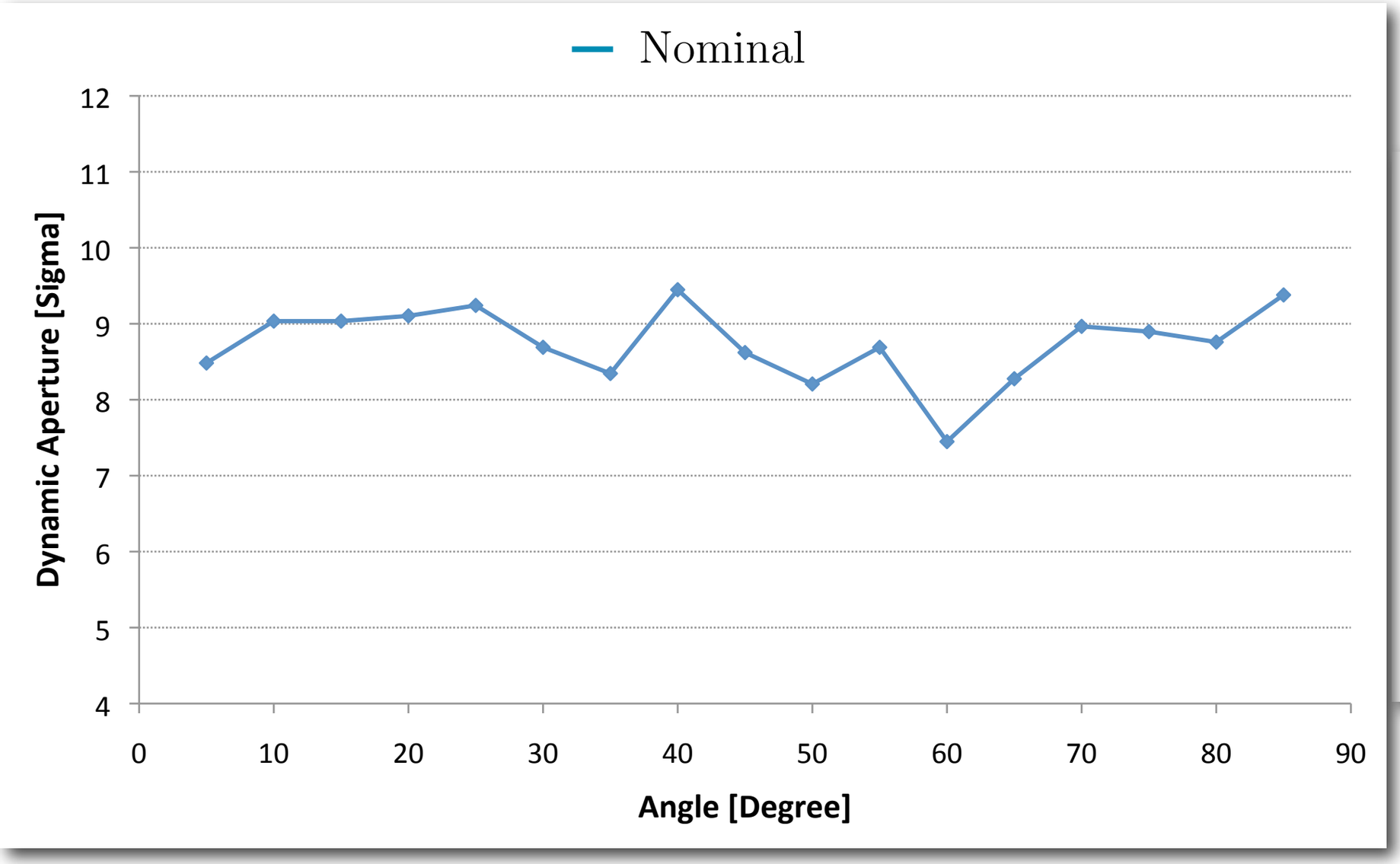
The ON_BETABEAT can switch on or off the off-momentum beta-beating correction in IP1, IP3, IP5 and IP7. When the switch is off the sextupoles are used only for Q' correction (same strength for all sextupoles family).

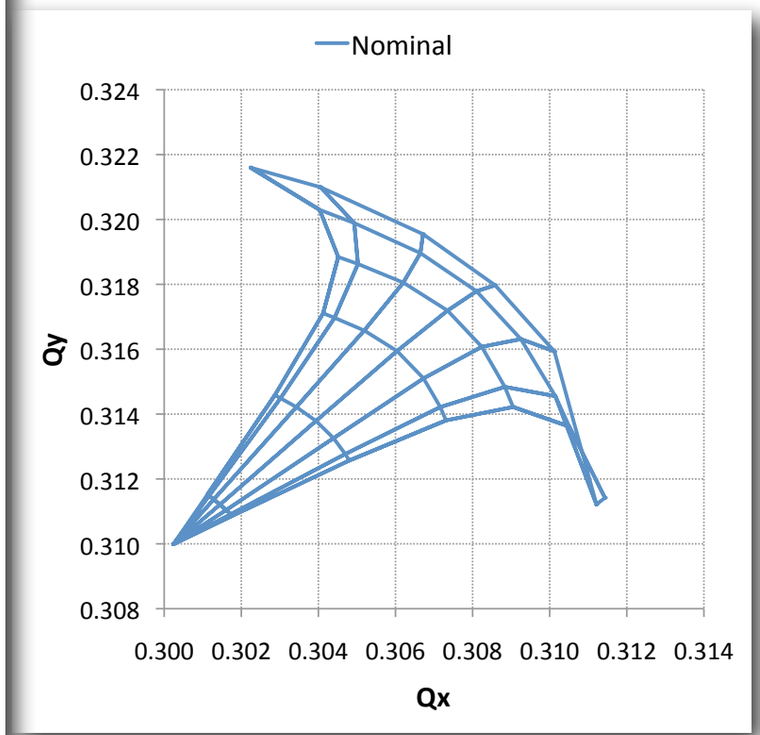
The ON_QPP can be used to correct the residual second order chromaticity with octupoles. This works only when beta-beating is corrected, otherwise the second order chromaticity is too big and it is not possible to correct.


Vertical Distance IP1
SLHC
Nominal
Separation [σ]
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
-20
-15
-10
-5
0
5
10
15
20
Encounter


Horizontal Distance IP5
SLHC
Nominal
Separation [σ]
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
-20
-15
-10
-5
0
5
10
15
20
Encounter

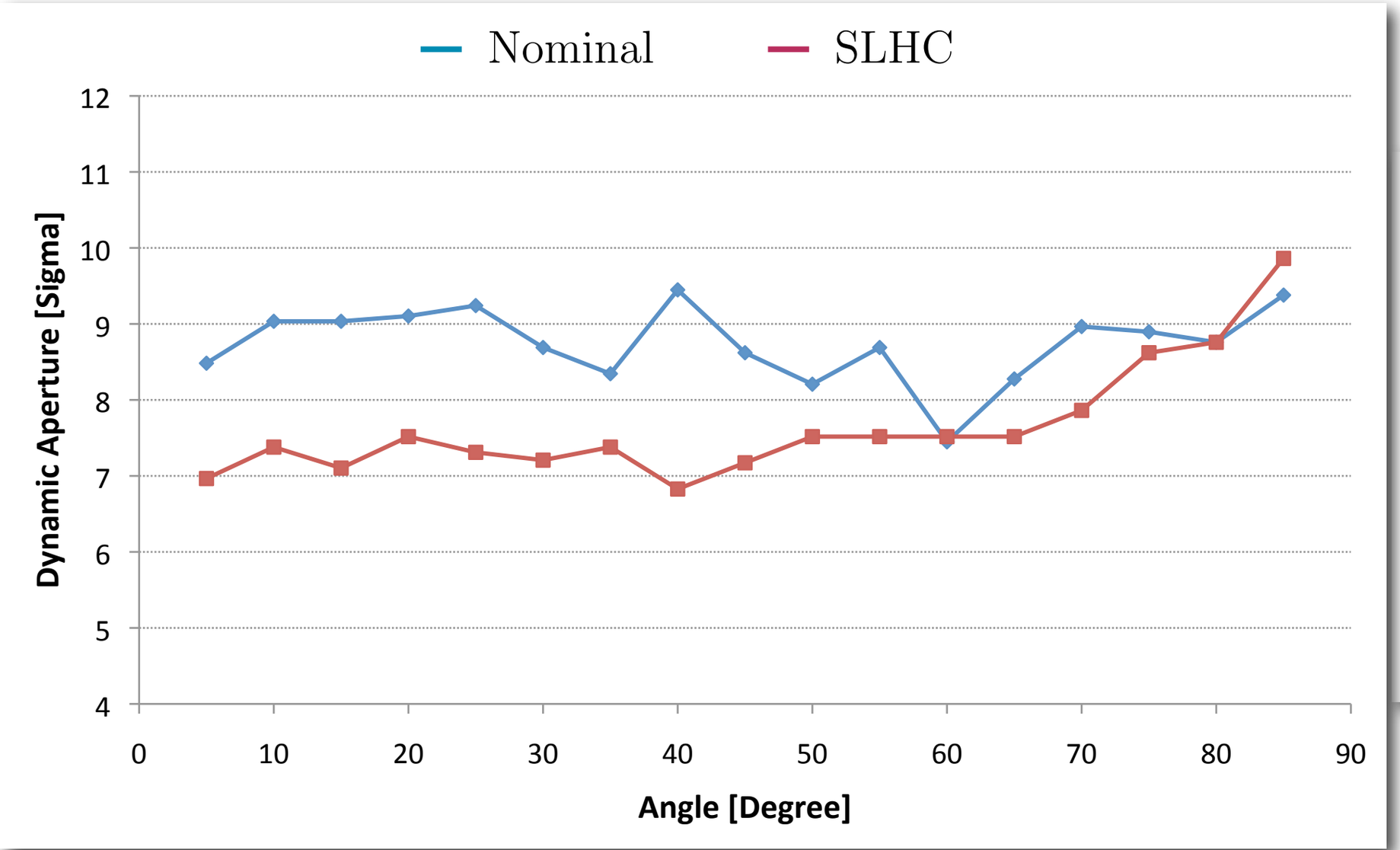
Nominal Optics

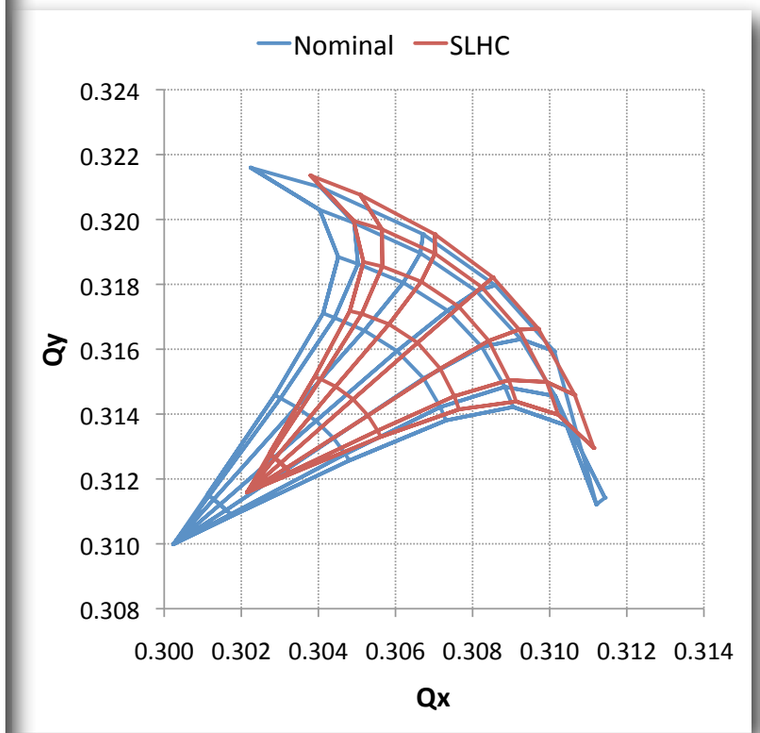




1.000.000 turns

Nominal Optics
vs
SLHC with Beta Beating Off and Q'' Off





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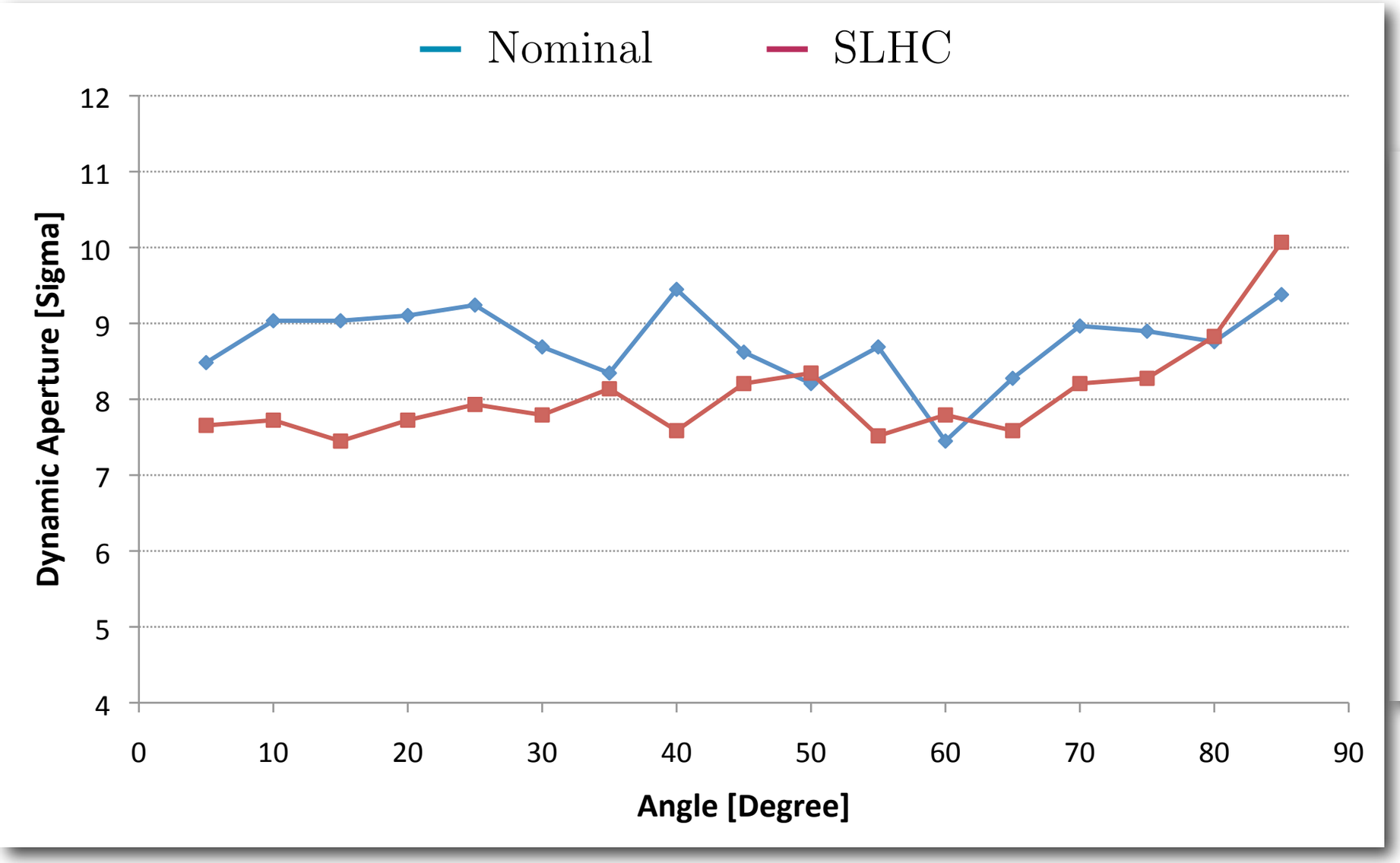

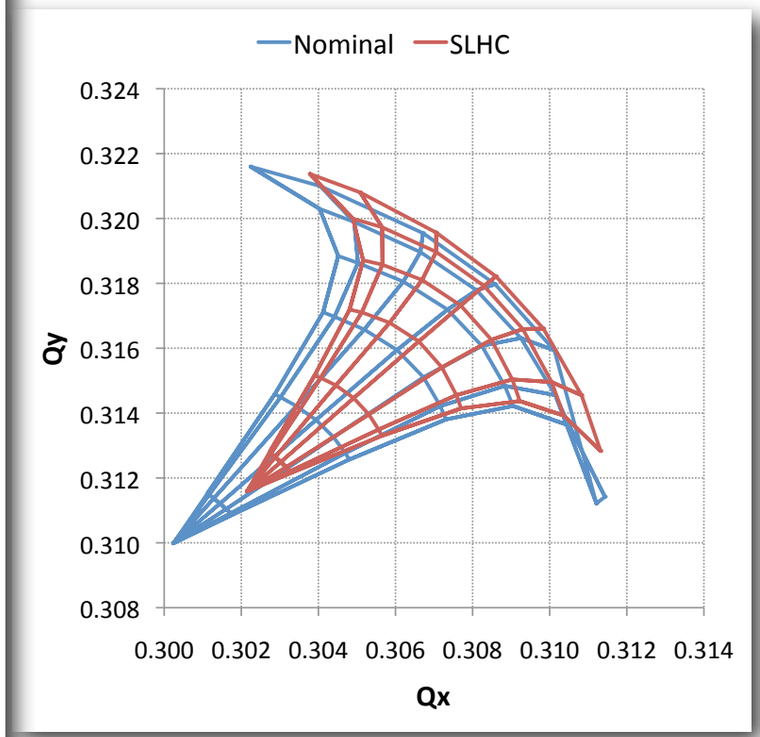

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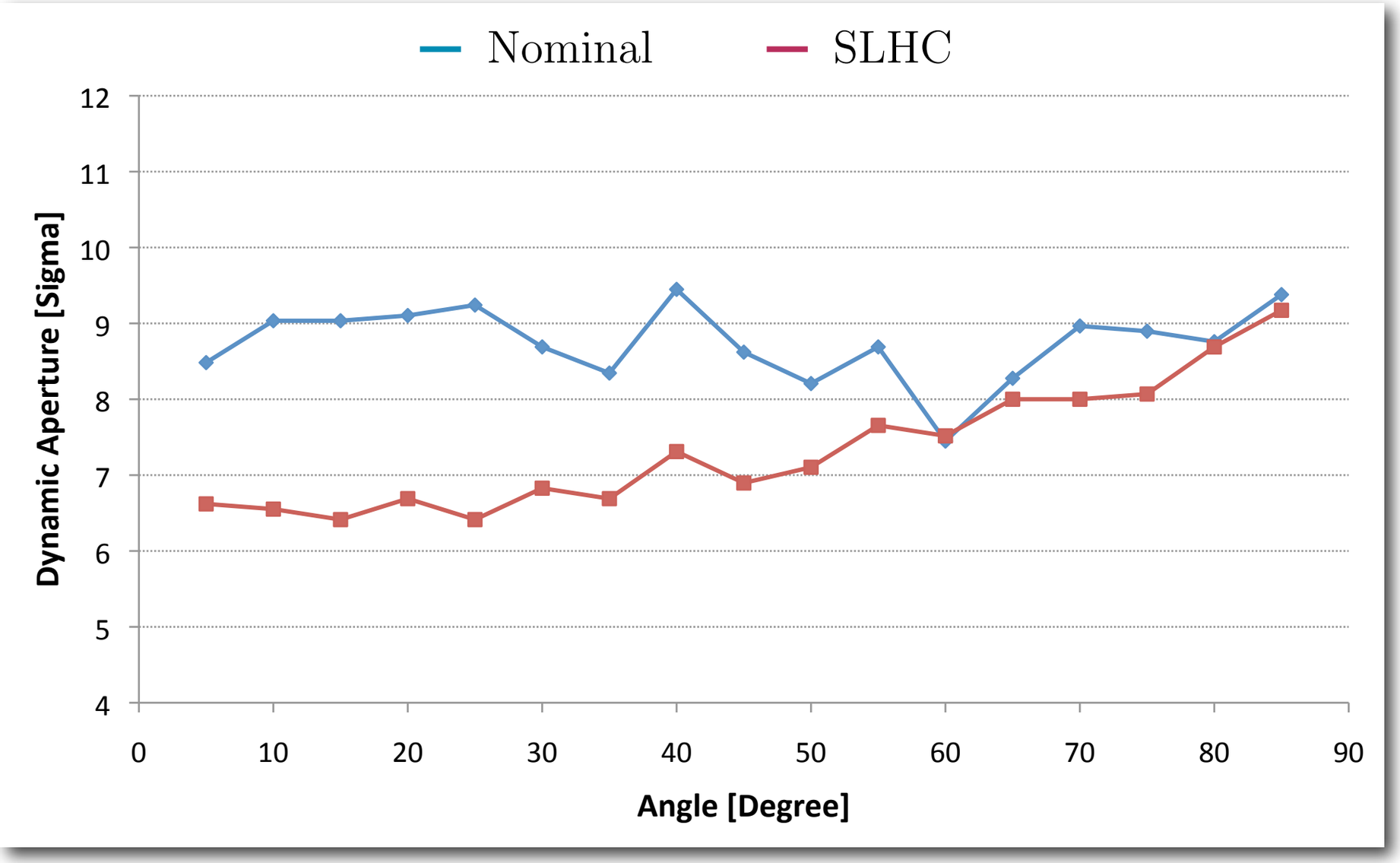

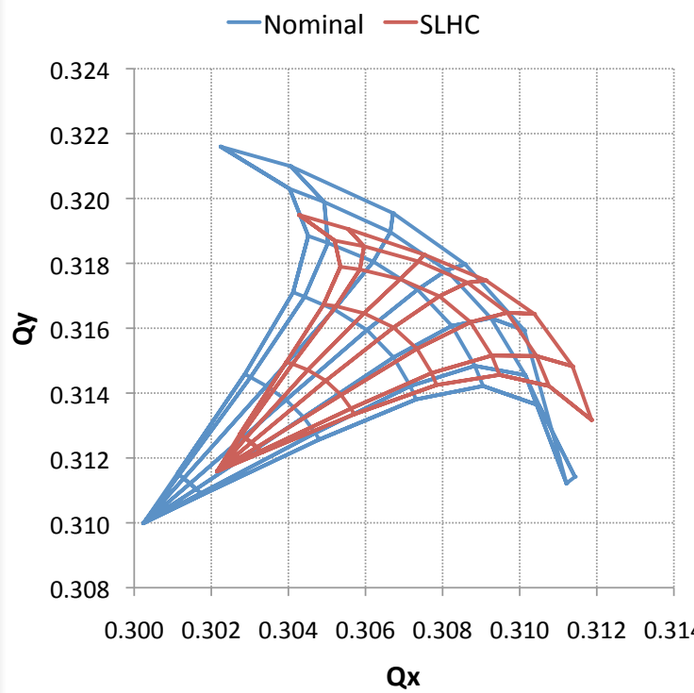

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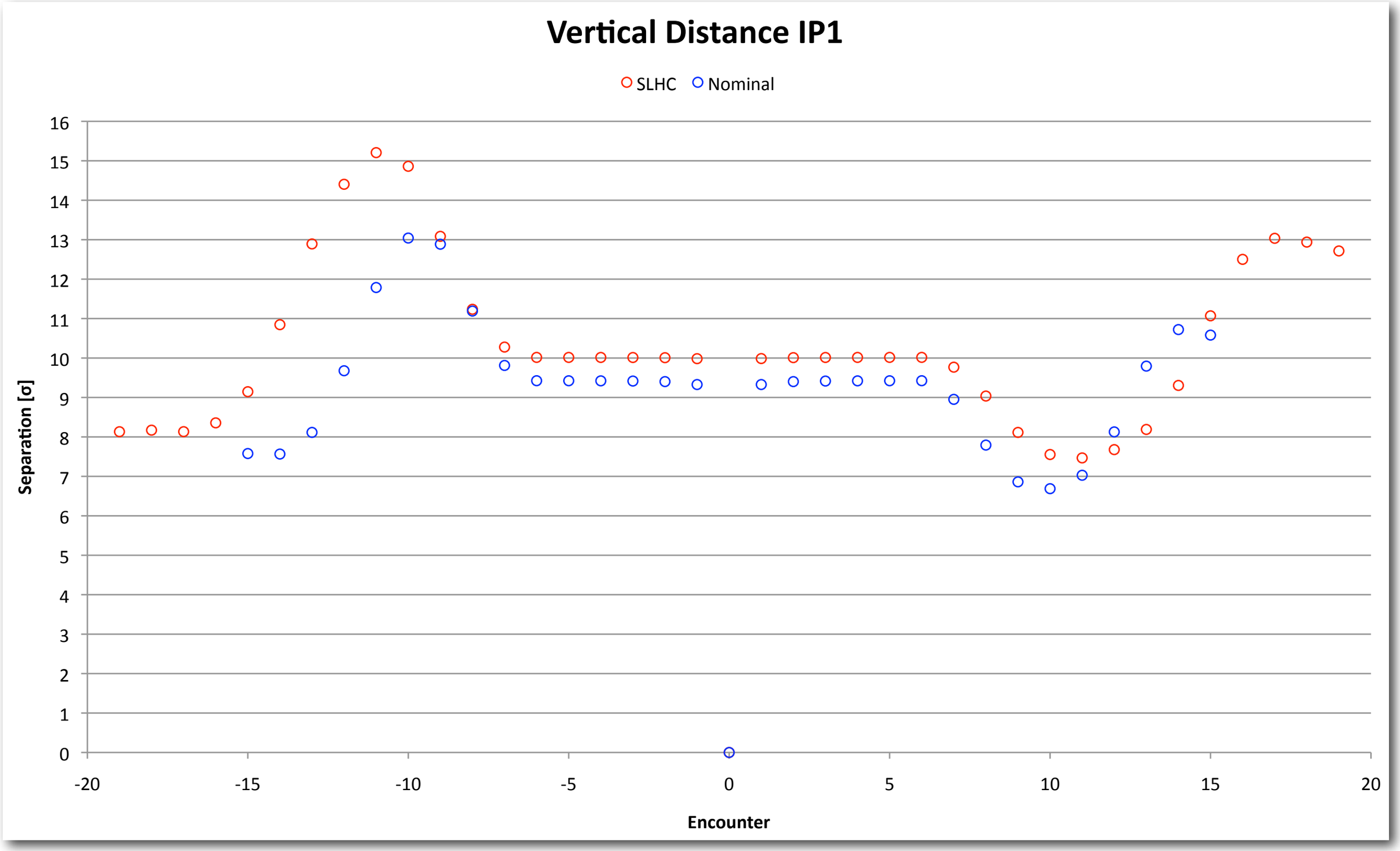
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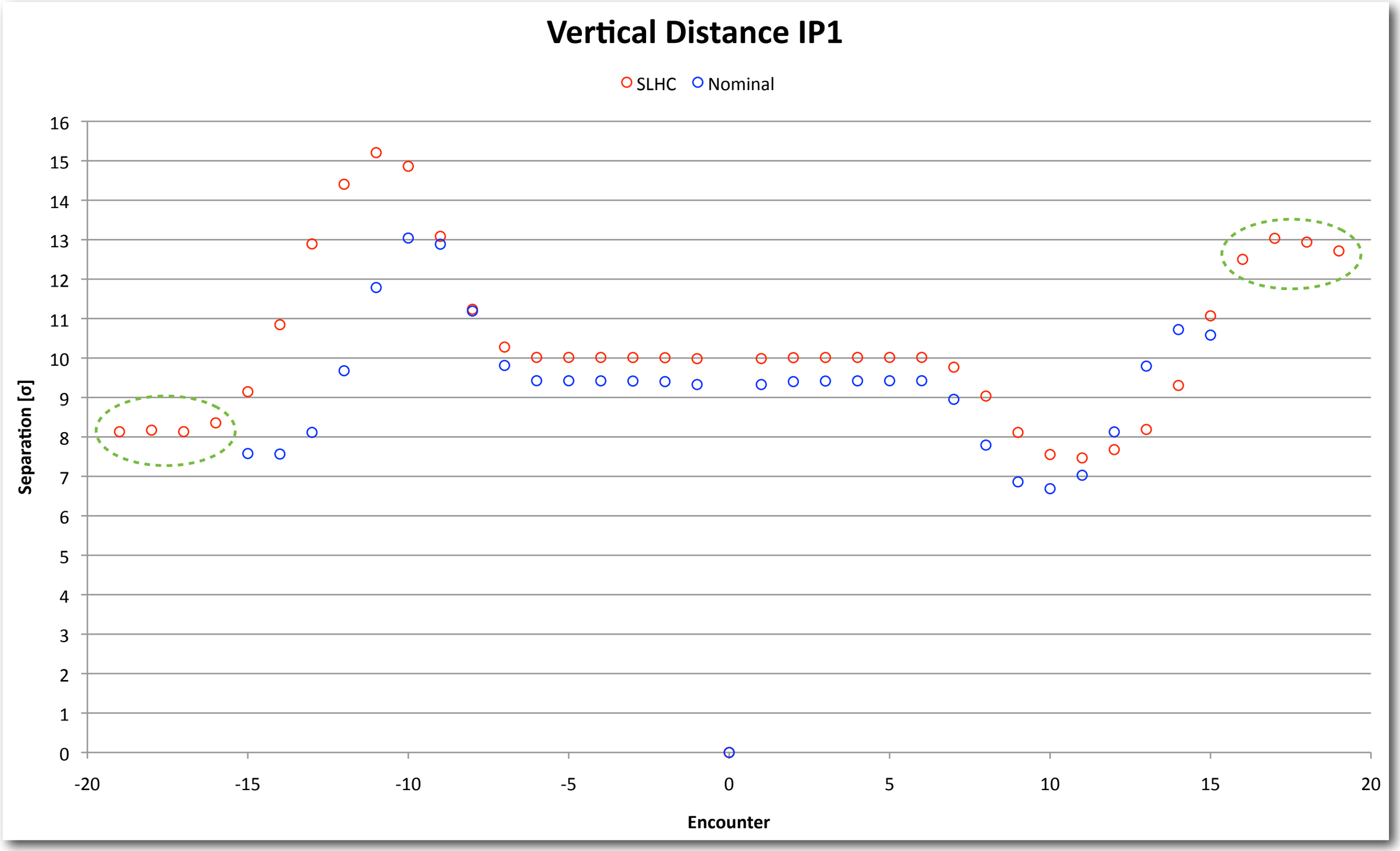
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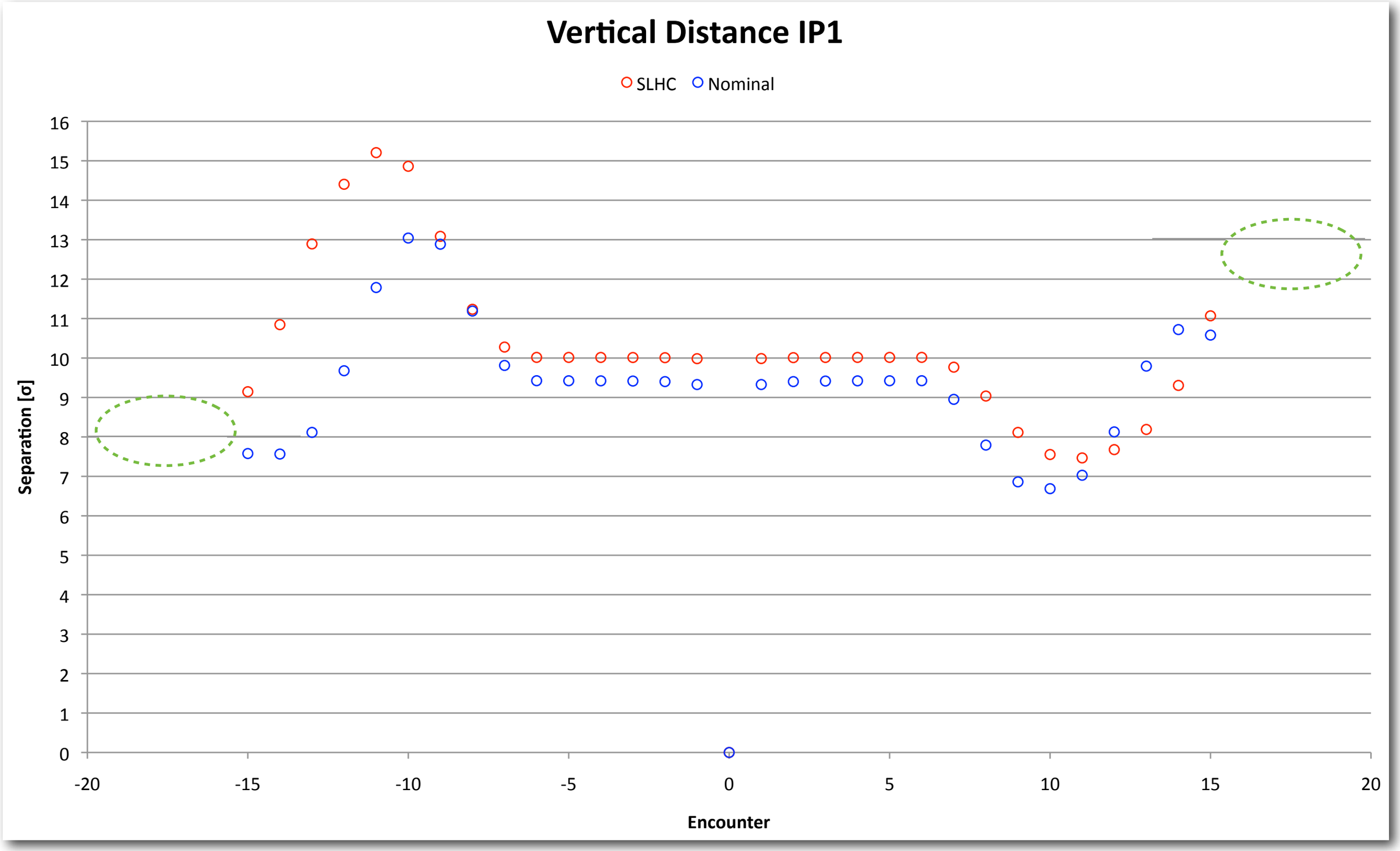
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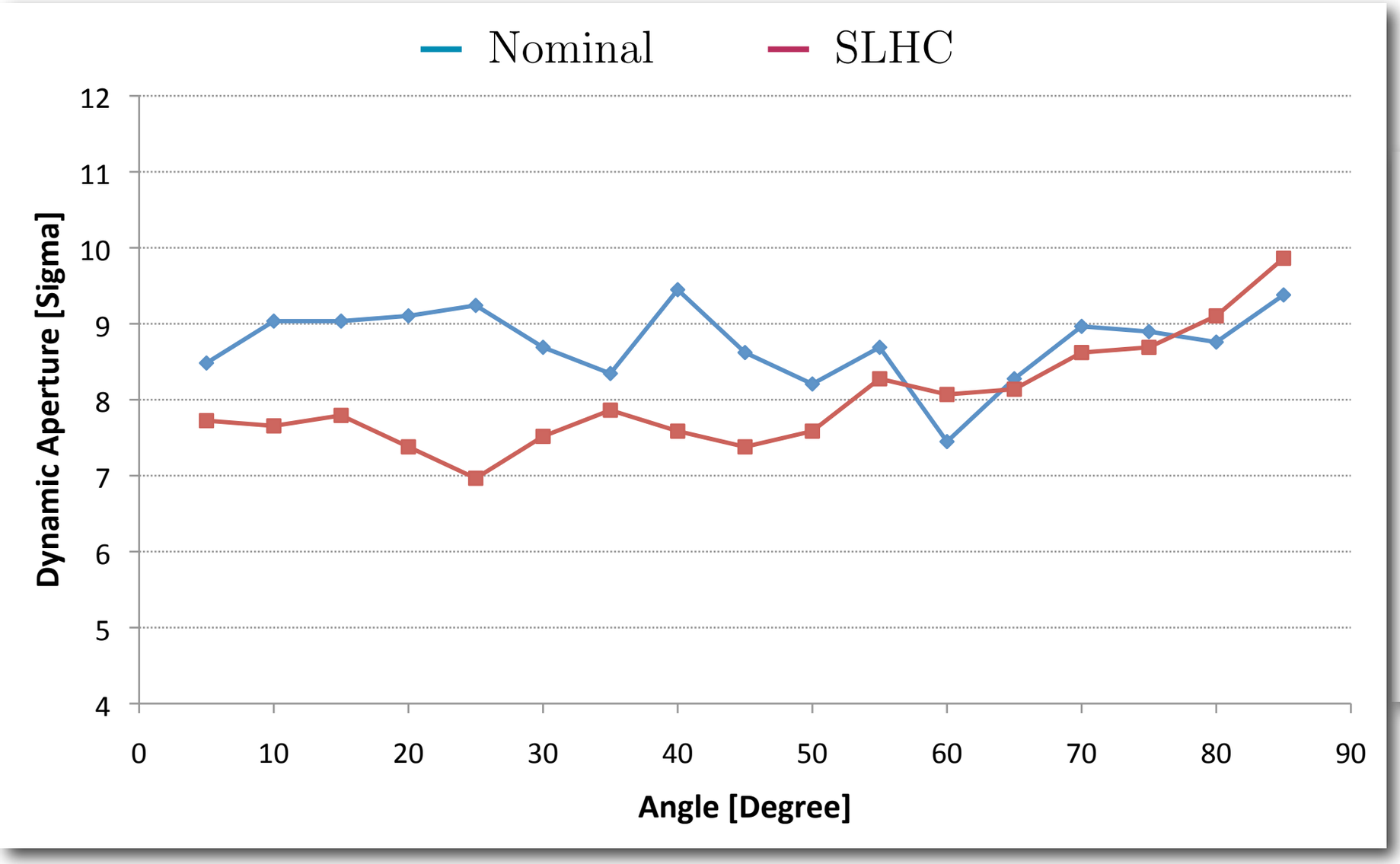
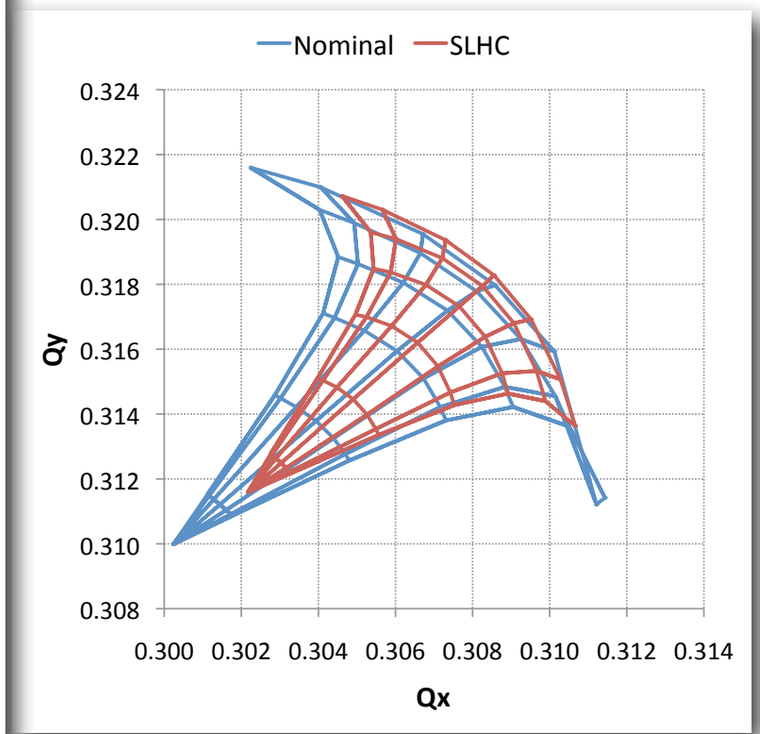
15 encounters





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Nominal Optics

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SLHC with Beta Beating On and Q'' Off

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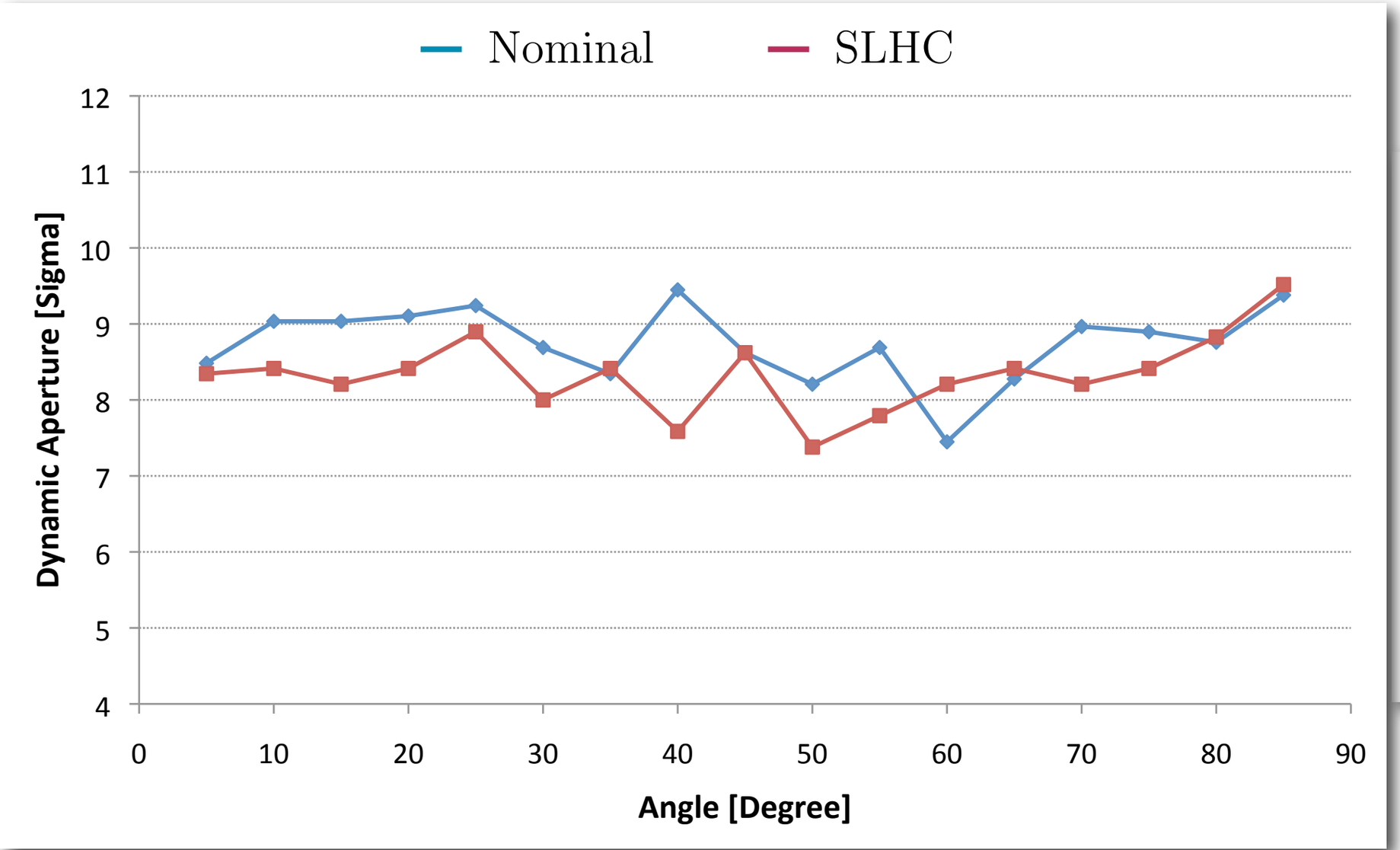

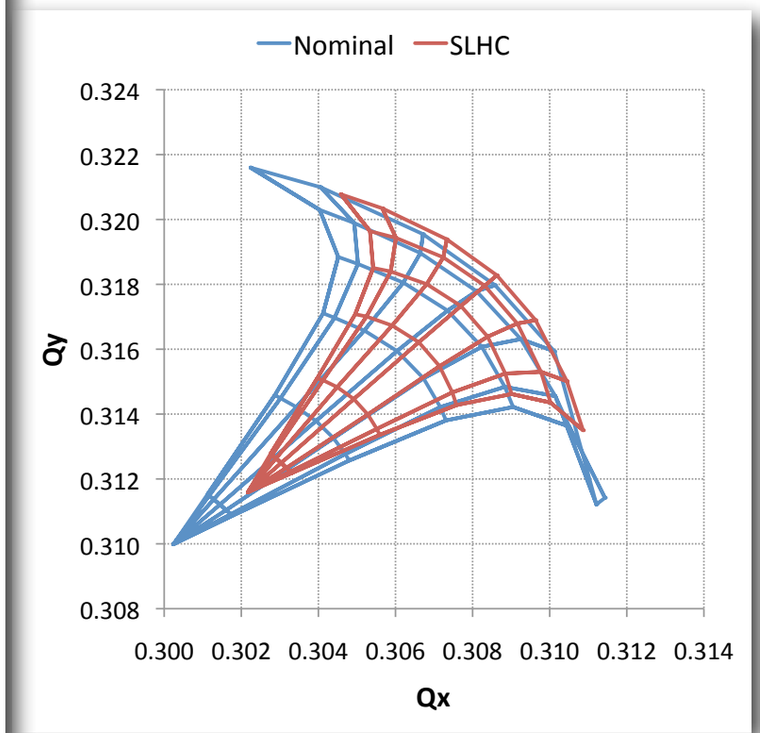

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Beam-Beam + Magnet Errors.

Thank you.