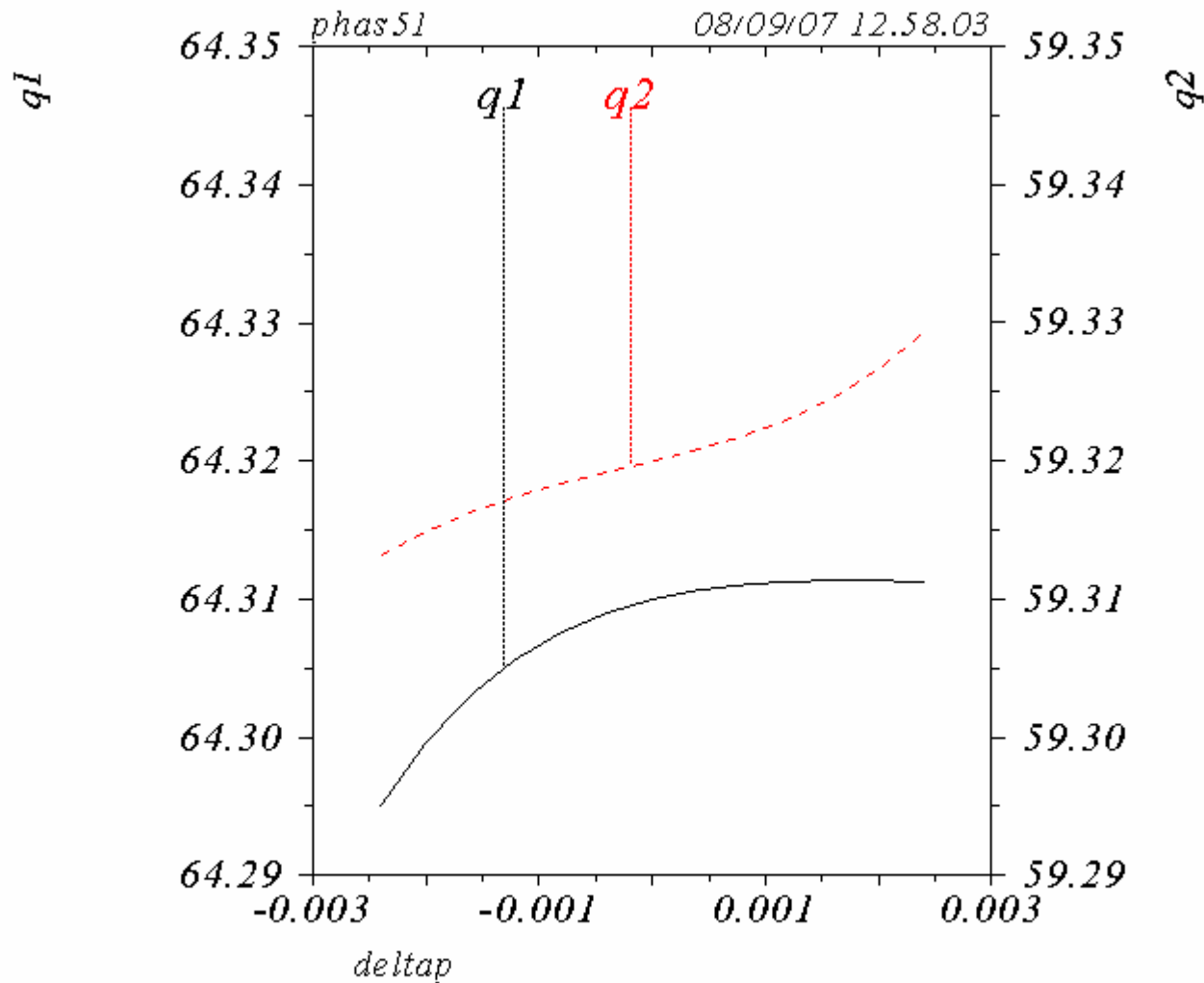**(LOC meeting 29.01.2007)**

A.Verdier, "Phase between IP's and non-linear chromaticity", LHC Project Note 103, August 1997 :
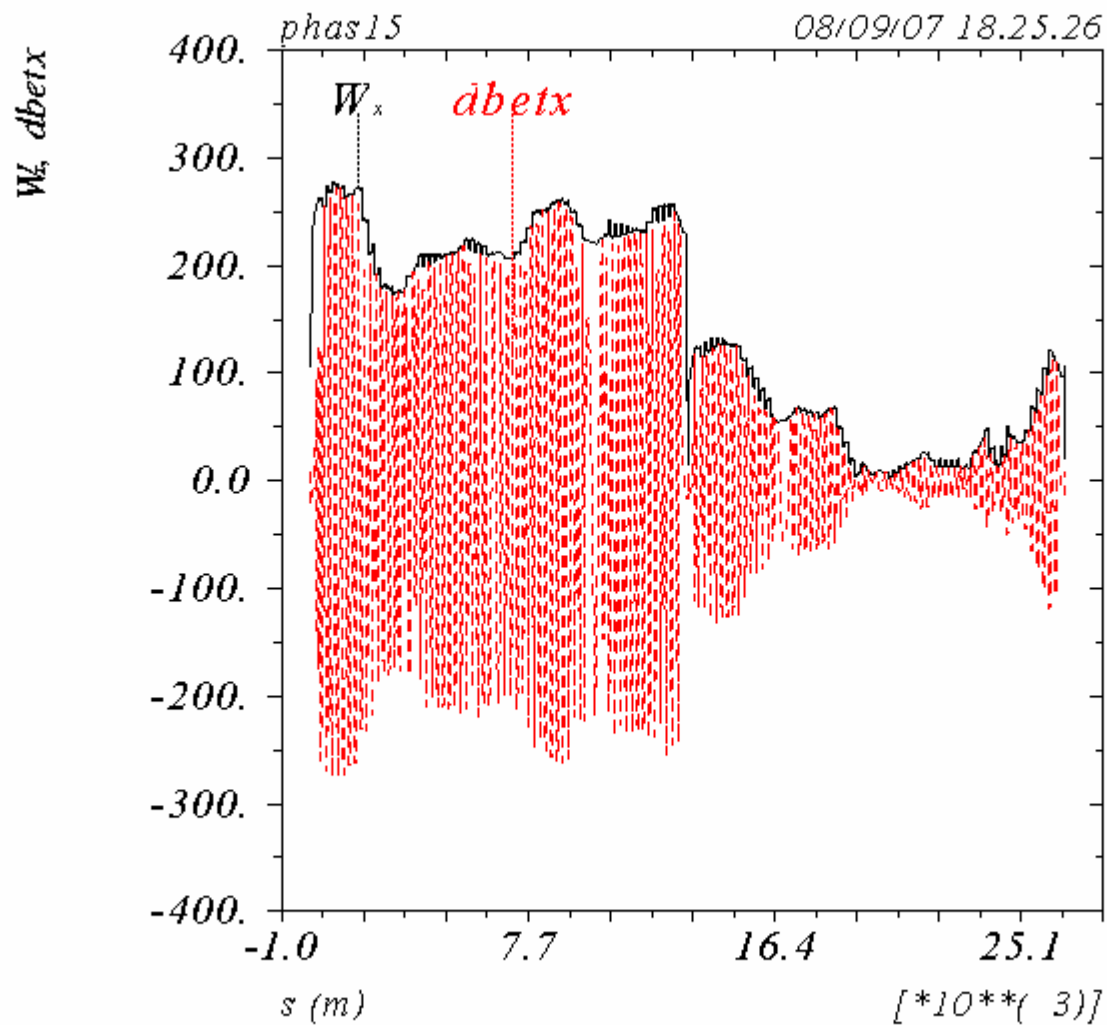
In "collision" optics at least one of the fractional phase advances IP1-IP5 and IP5-IP1 must be around .25 or .75 (tolerance 0.01).

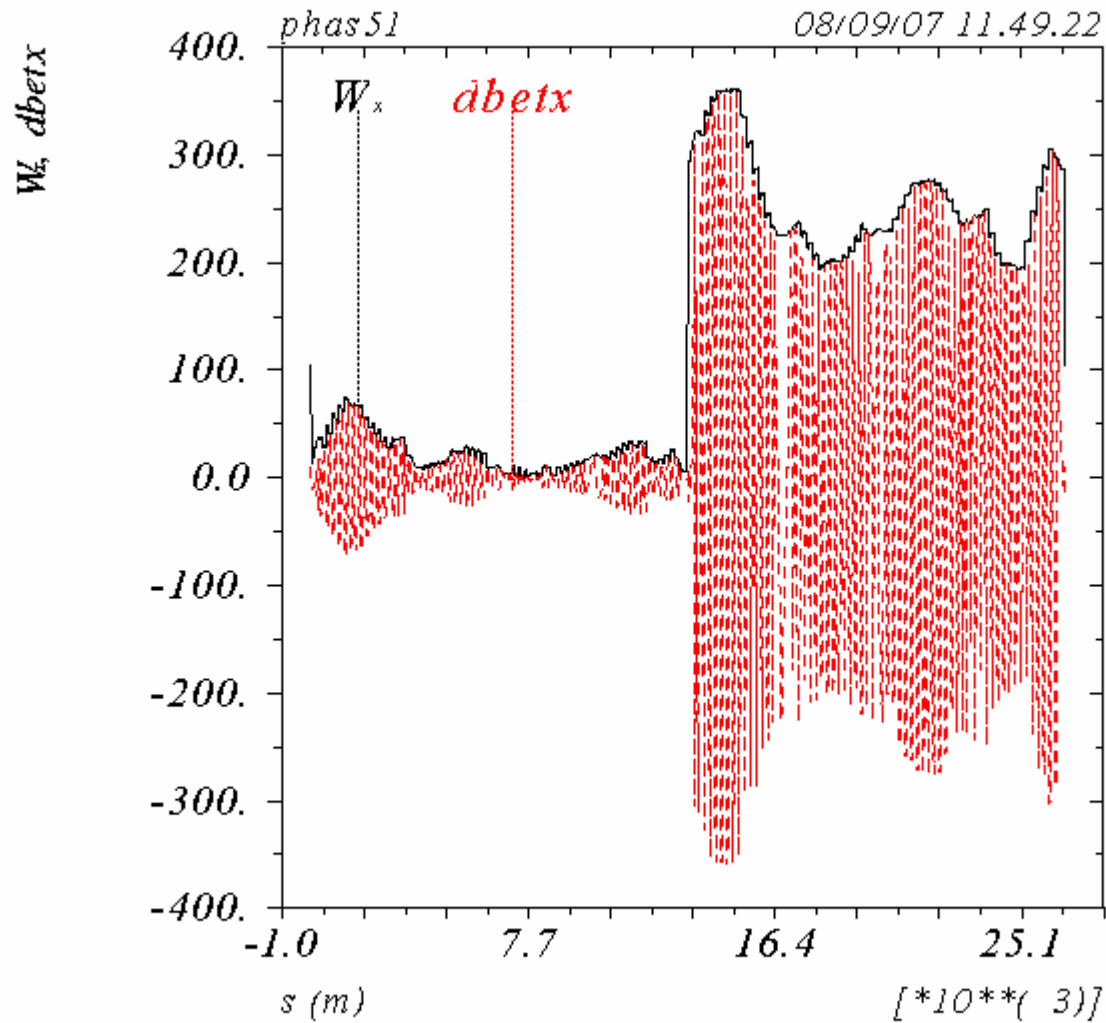|	MUX	MUY	dmuX	dmuY
V6.4				
"IP1"	0.000000	0.000000	.06	.76
"IP5"	32.060602	29.761134		
"IP1.L1"	64.310000	59.320000	.25	.56
V6.5				
"IP1"	0.000000	0.000000	.05	.60
"IP5"	32.049602	29.604127		
"IP1.L1"	64.310000	59.320001	.26	.72
V6.501				
"IP1"	0.000000	0.000000	.98	.73
"IP5"	31.980940	29.734470		
"IP1.L1"	64.310000	59.320001	.33	.59

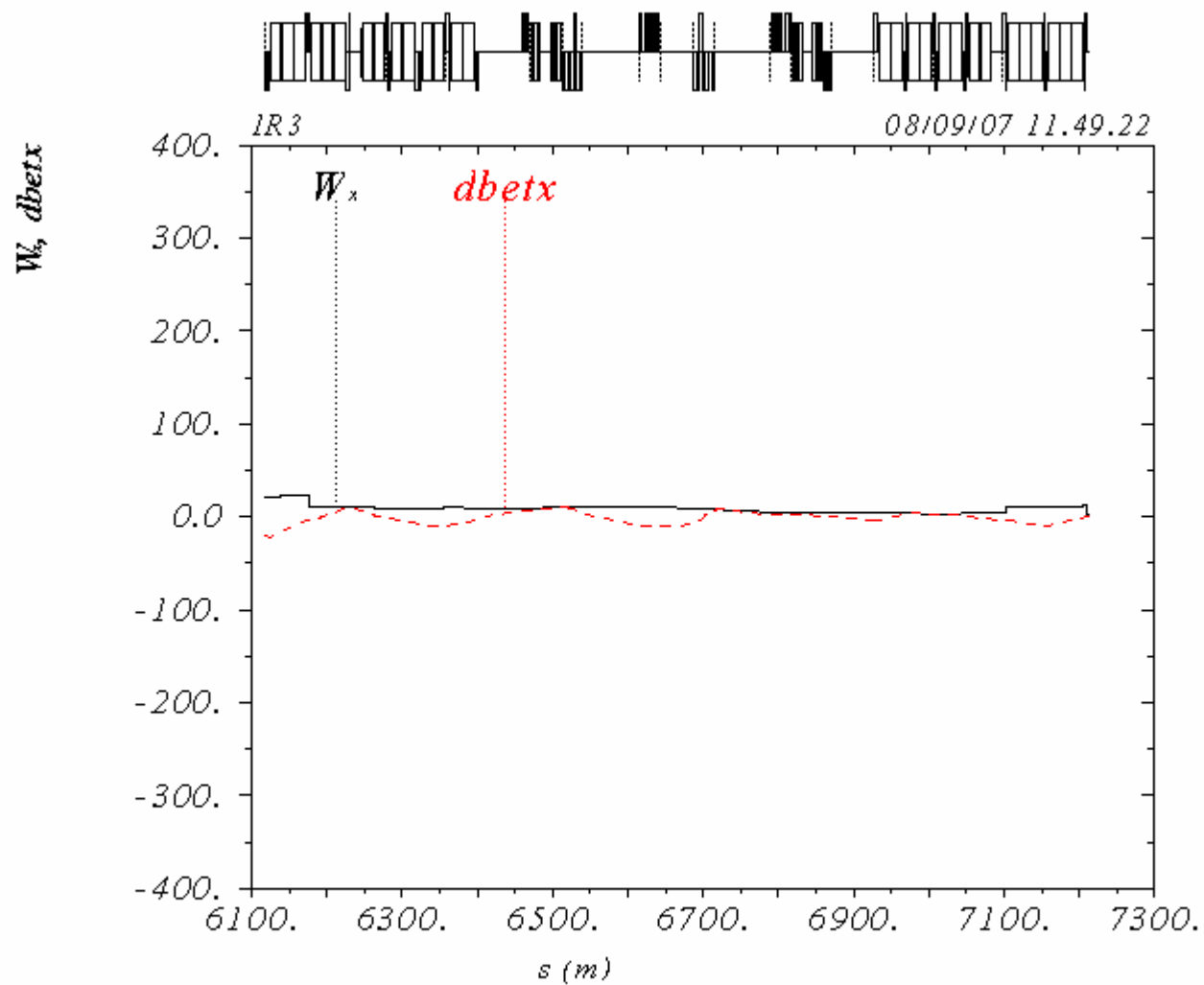# Control of tunes vs. deltap with 2 squeezed IPs

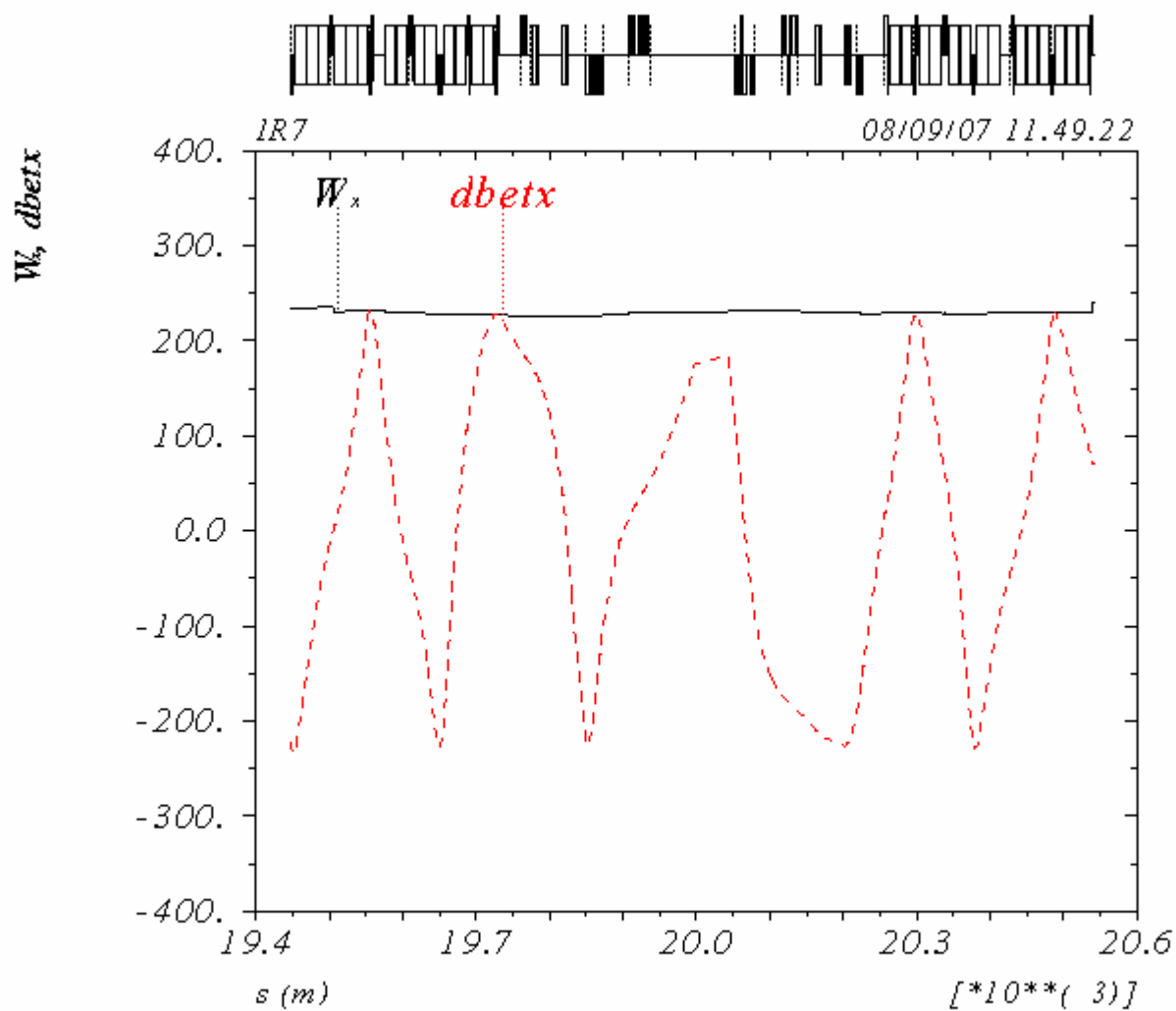# Beta beating with magic phases IP1-IP5, using 32 families

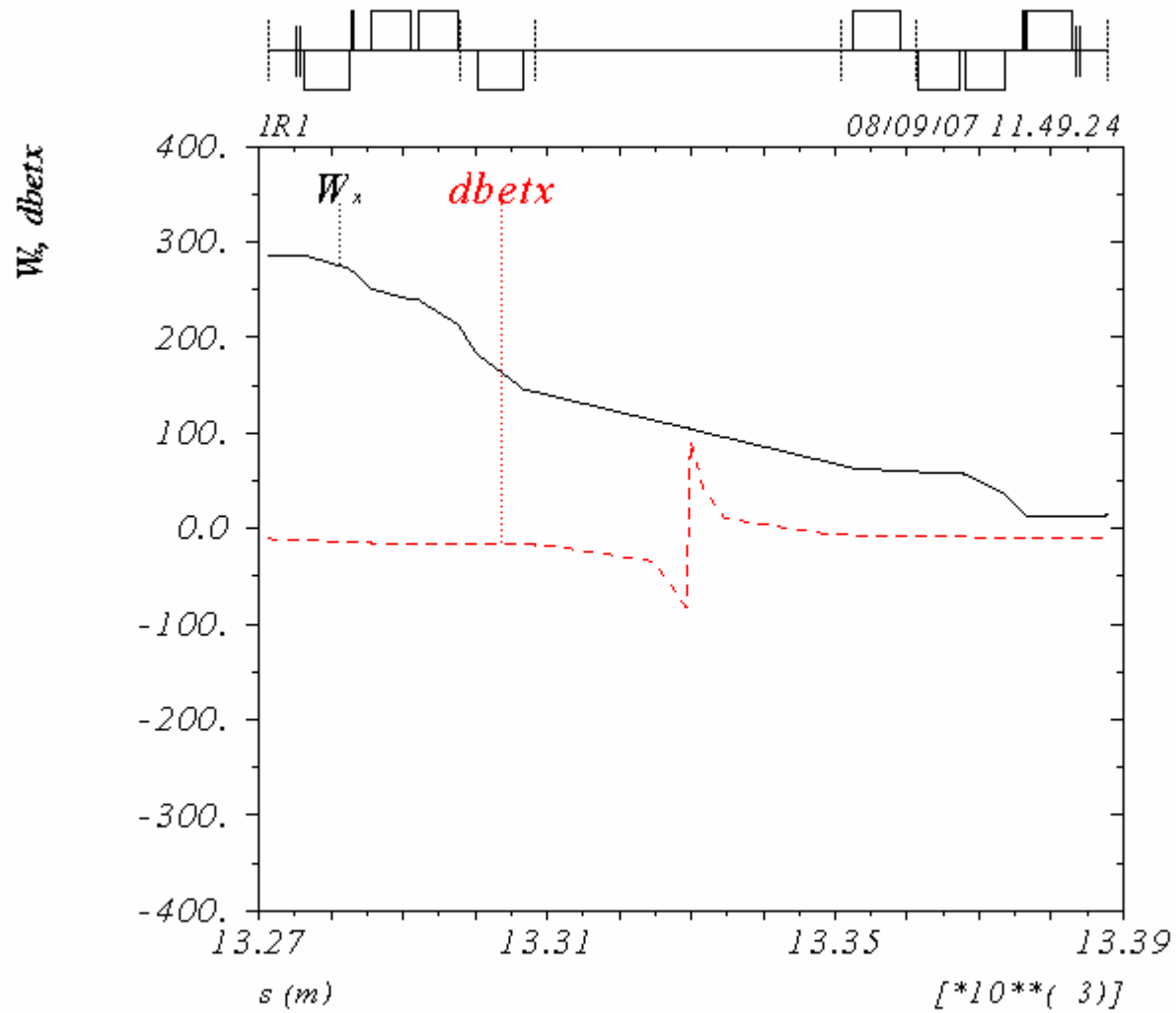# Beta beating with magic phases IP5-IP1, using 32 families

Magic phases IP5-IP1:   zoom on IR3

Magic phases IP5-IP1:   zoom on IR7

Zoom on IR1

Conclusions

Using 32 sextupole families allows to control the local chromatic properties of IP1 + IP5 + one Cleaning Insertion

Relative beta derivatives with deltap below 10 may be achieved

Magic phase advances yield better performances, and also limit the spread in the strengths of the 32 sextupole families

In this study the IP1-IP5 and IP5-IP1 phase advances were so far adjusted using the MQT in arcs, without rematching the IRs

Optimization is (presently) very time consuming