Parassitic crossings linear effect on tune shifts

M. Biagini, 16/2/04

Hourglass (Luminosity)

$$R(u_x, u_y) \equiv \frac{\mathcal{L}}{\mathcal{L}_0} = \int_{-\infty}^{\infty} \frac{du}{\sqrt{\pi}} \frac{\exp(-u^2)}{\sqrt{(1+u^2/u_x^2)(1+u^2/u_y^2)}}$$

$$u_x^2 = \frac{2(\sigma_{x+}^{*2} + \sigma_{x-}^{*2})}{(\sigma_{z+}^2 + \sigma_{z-}^2)\left(\sigma_{x+}^{*2}/\beta_{x+}^{*2} + \sigma_{x-}^{*2}/\beta_{x-}^{*2}\right)}$$

$R(u_y,u_x)$ always <1

Hourglas (Tune shifts)

$$R_{y+}(z) \equiv \frac{\xi_{y+}(z)}{\xi_{0y+}} = \int_{-\infty}^{\infty} \frac{du}{\sqrt{\pi}} \frac{(1+u^2/u_1^2)\exp(-(u-u_0)^2)}{\sqrt{1+u^2/u_2^2}\left(v\sqrt{1+u^2/u_2^2}+h\sqrt{1+u^2/u_3^2}\right)}$$

$$h = \frac{\sigma^*_{x-}}{\sigma^*_{x-}+\sigma^*_{y-}}, \quad v = \frac{\sigma^*_{y-}}{\sigma^*_{x-}+\sigma^*_{y-}}$$

$$u_0 = \frac{z}{\sqrt{2}\sigma_{z-}}, \quad u_1 = \frac{\sqrt{2}\beta^*_{y+}}{\sigma_{z-}}, \quad u_2 = \frac{\sqrt{2}\beta^*_{y-}}{\sigma_{z-}}, \quad u_3 = \frac{\sqrt{2}\beta^*_{x-}}{\sigma_{z-}}$$

$R_{y,x}$ can be >1 or <1

FINUDA

I^+(mA)	800	β_x*(m)	2.4	ε_x (10^{-6})	.42
I^-(mA)	800	β_y*(m)	.024	κ	1.2%
$L_{meas}(10^{31})$	6	$L_{th}(10^{31})$	6.	N^+/N^-	$1.81e^{10}$
ξ_x^{meas}	.016	ξ_x^{th}	.019	θ(mrad)	11.5
ξ_y^{meas}	.0163	ξ_y^{th}	.02	Piwinski	.23

KLOE

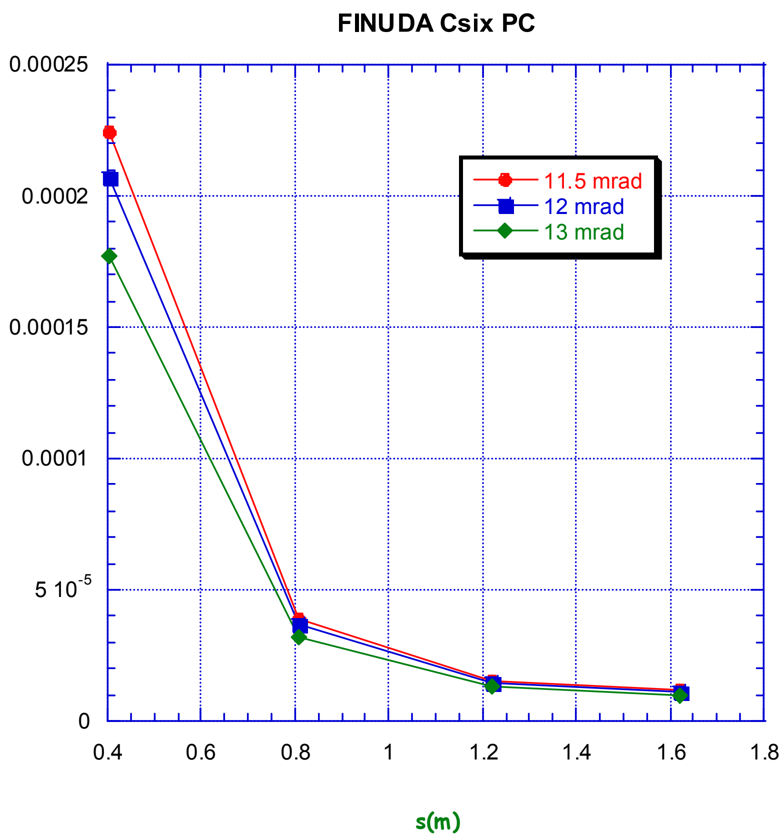
I^+(mA)	800	β_x*(m)	1.7	ε_x (10^{-6})	.42
I^-(mA)	800	β_y*(m)	.027	κ	1.%
L_{mis}(10^{31})		L_{cal}(10^{31})	6.7	N^+/N^-	1.81e^{10}
ξ_x^{mis}		ξ_x^{cal}	.017	θ(mrad)	17.
ξ_y^{mis}		ξ_y^{cal}	.024	Piwinski	0.4

PCs

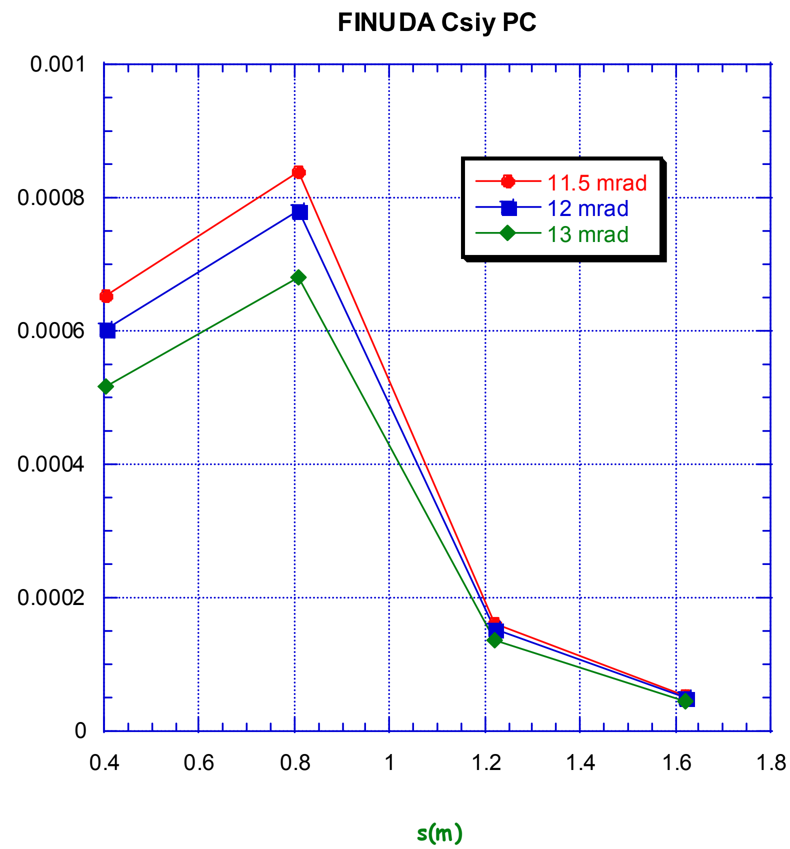
- With 90 bunches: 1st PC is at 0.4 m from IP

- With 45 bunches: 1st PC is at 0.8 m from IP

FINUDA PCs

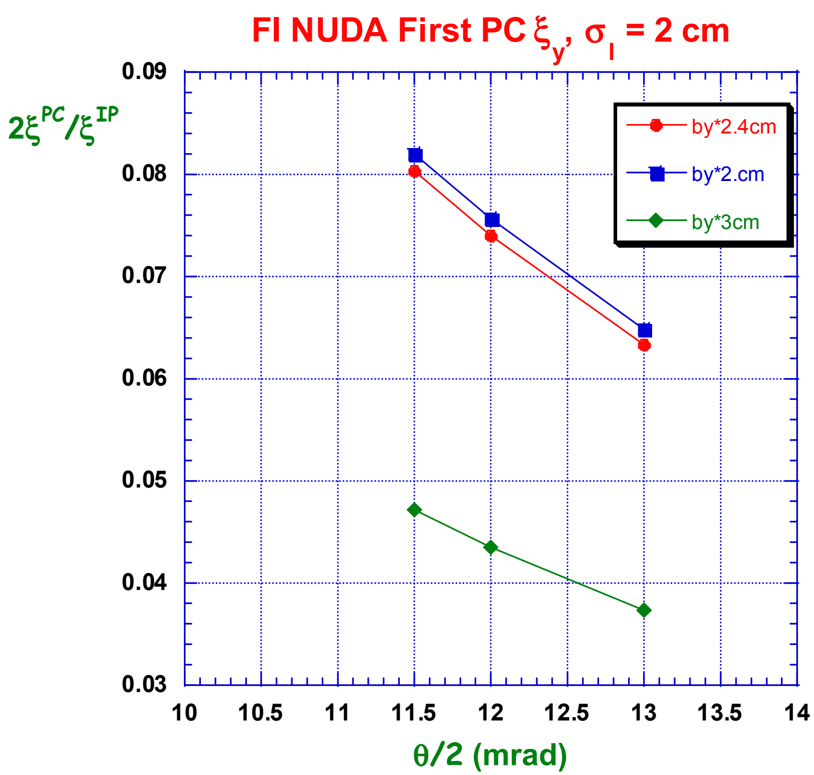


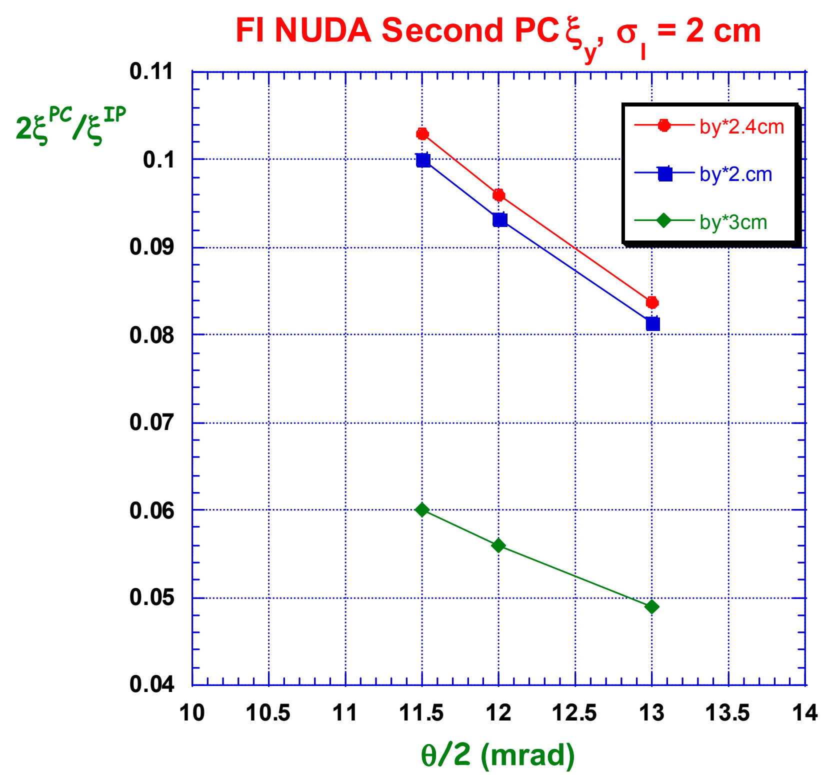
FINUDA Csix PC
0.00025
0.0002
0.00015
0.0001
5 10^-5
0
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
11.5 mrad
12 mrad
13 mrad
s(m)



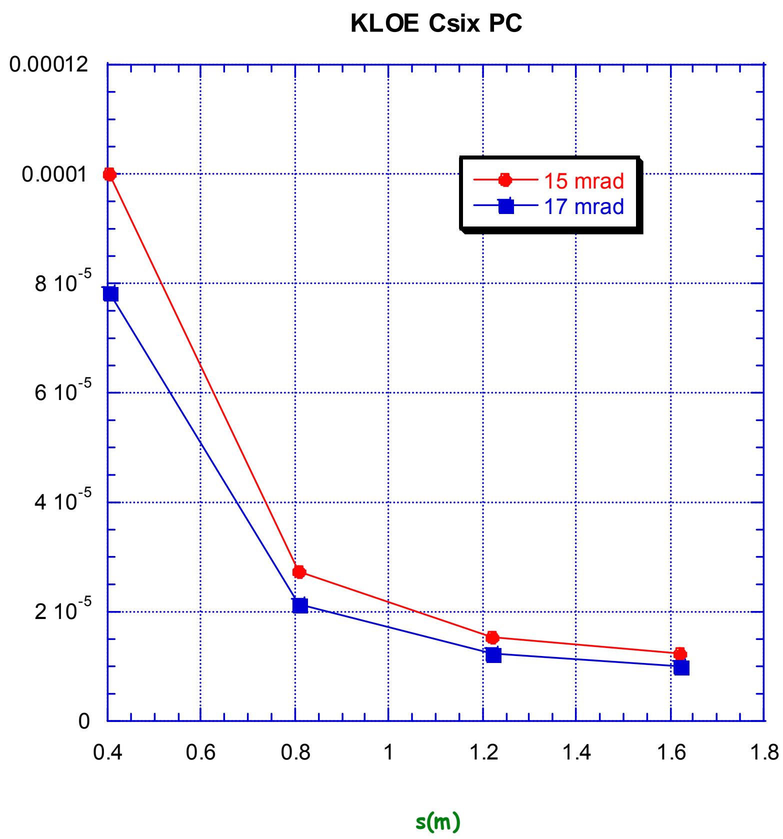
FINUDA Csiy PC
0.001
0.0008
0.0006
0.0004
0.0002
0
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
11.5 mrad
12 mrad
13 mrad
s(m)

FINUDA 1st & 2nd PC

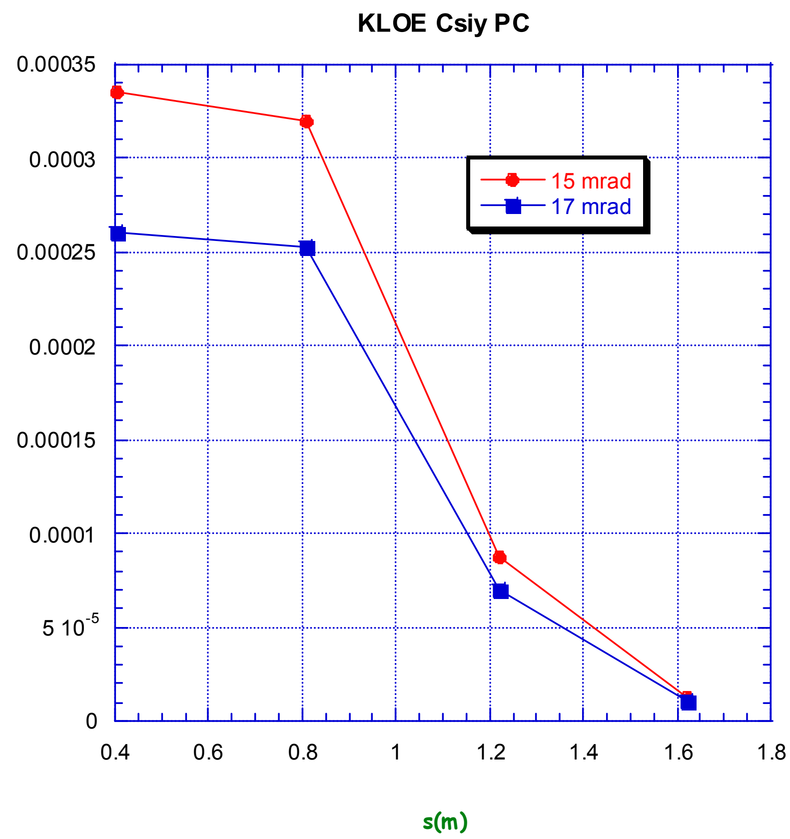




KLOE PCs

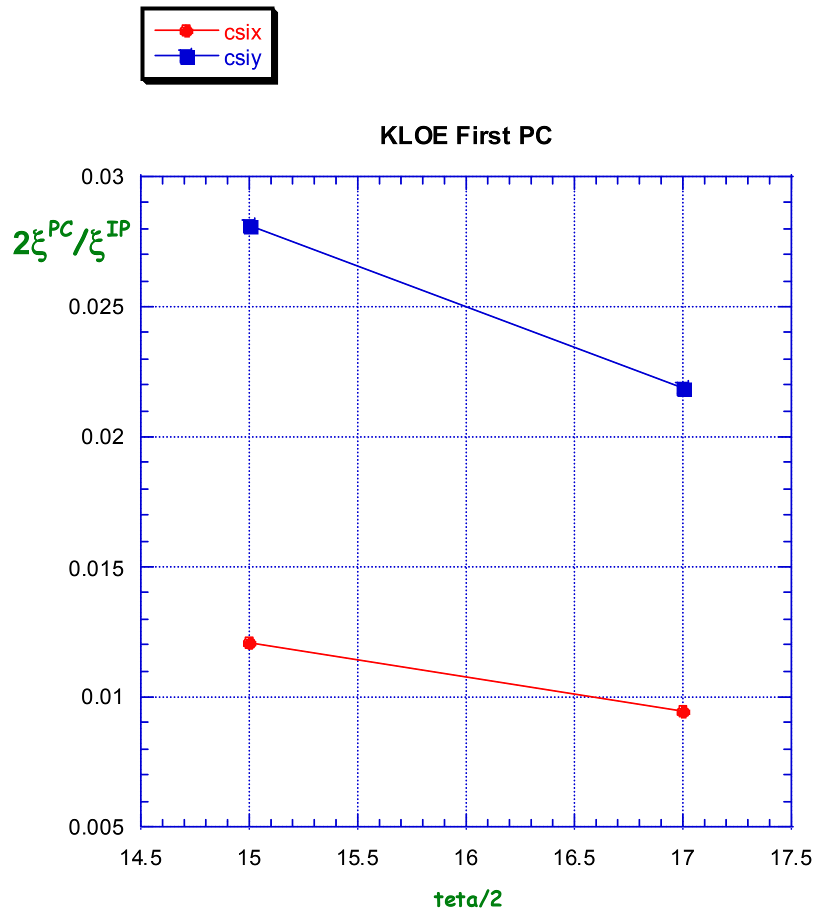


KLOE Csix PC
0.00012
0.0001
8 10-5
6 10-5
4 10-5
2 10-5
0
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
15 mrad
17 mrad
s(m)



KLOE Csiy PC
0.00035
0.0003
0.00025
0.0002
0.00015
0.0001
5 10-5
0
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
15 mrad
17 mrad
s(m)

KLOE 1st PC



csix
csiy
KLOE First PC
0.03
0.025
0.02
0.015
0.01
0.005
$2\xi^{PC}/\xi^{IP}$
14.5
15
15.5
16
16.5
17
17.5
teta/2