Status on SPS impedance studies

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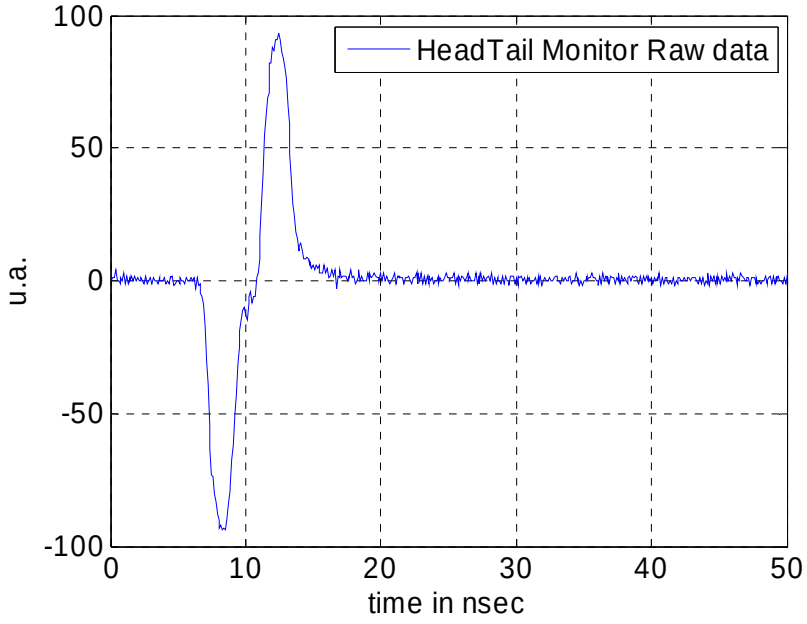
Agenda

- Still a lot of work to be performed
- 2007 Experiments: Bunch Length measurements
- Zbase: Issues with summing the impedance contributions

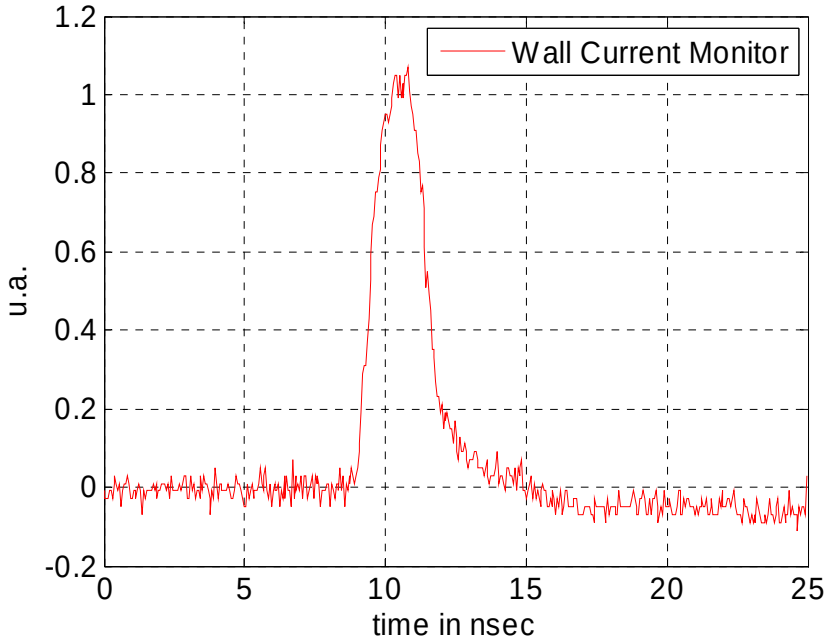
Bunch Length Measurements (raw data)

Same supercycle (SC 7618 on Nov 2nd 2007), injection cycle

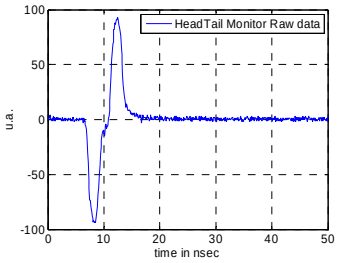
HeadTail Monitor (R. Steinhagen)

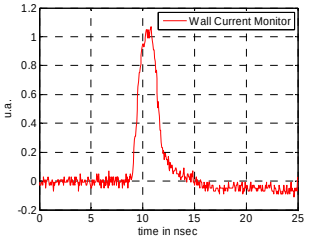


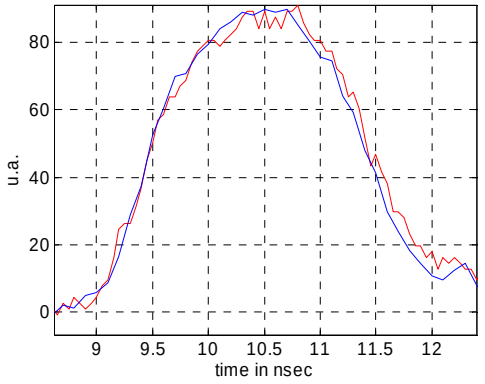
Wall Current Monitor (T. Bohl and G. Papotti)



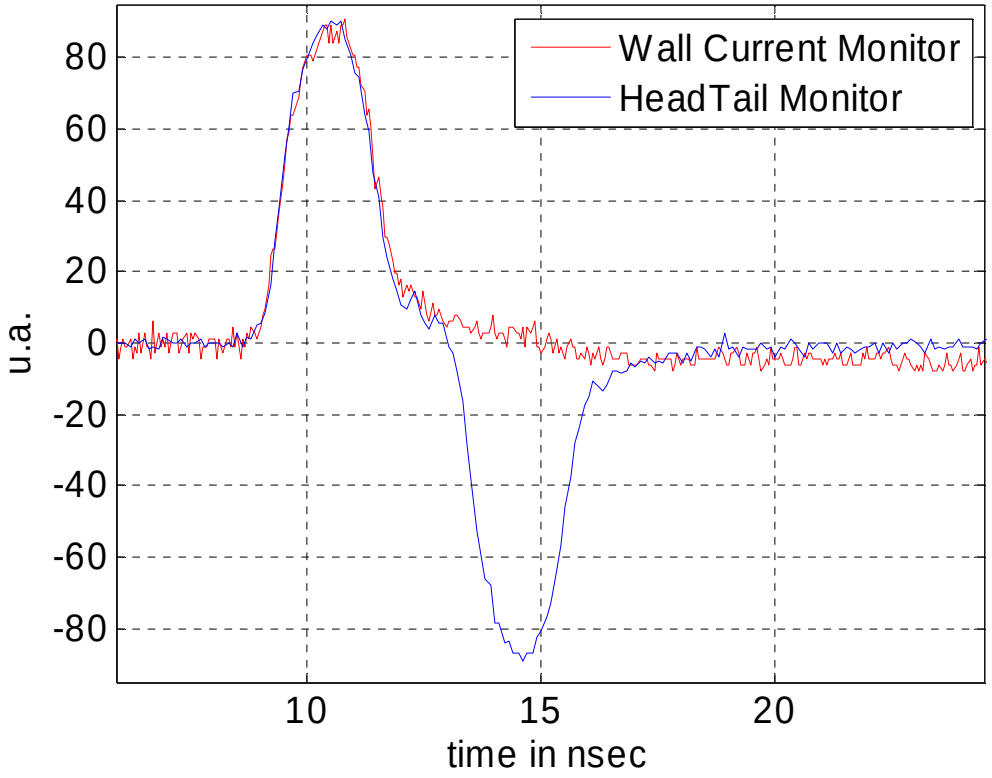
Bunch Length measurements (raw data)



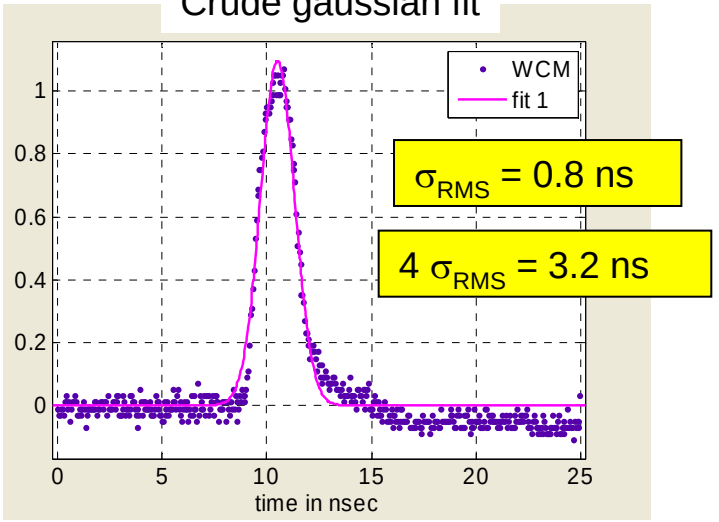




Time alignment
HT opposed



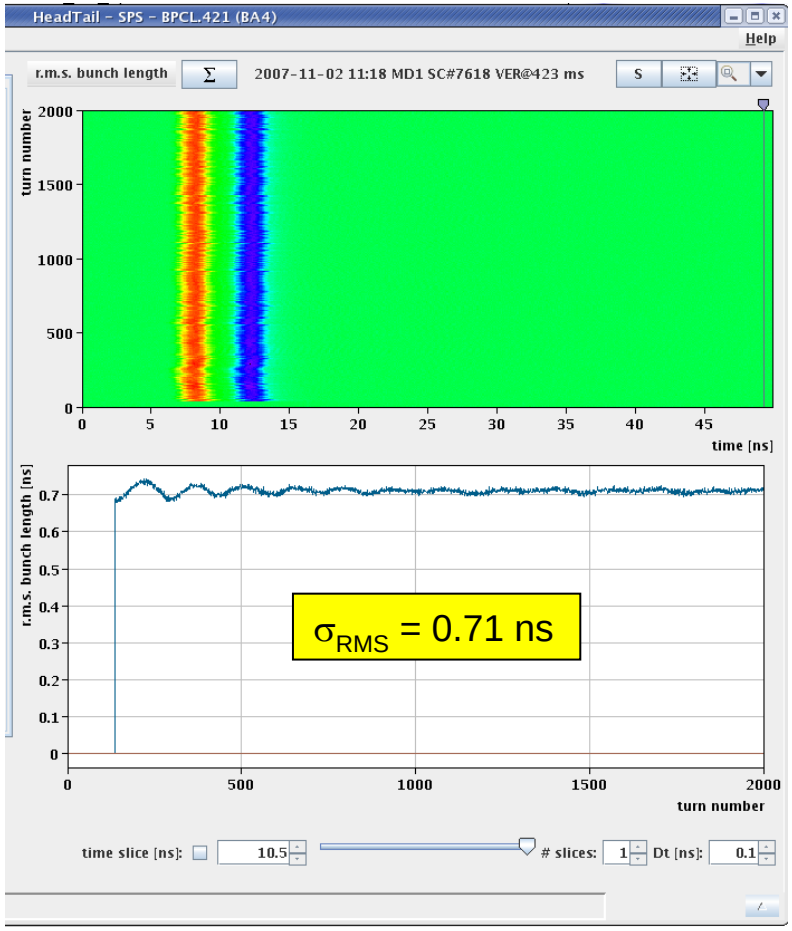
Crude gaussian fit



→Raw data are very consistent between the HT monitor and the WCM monitor

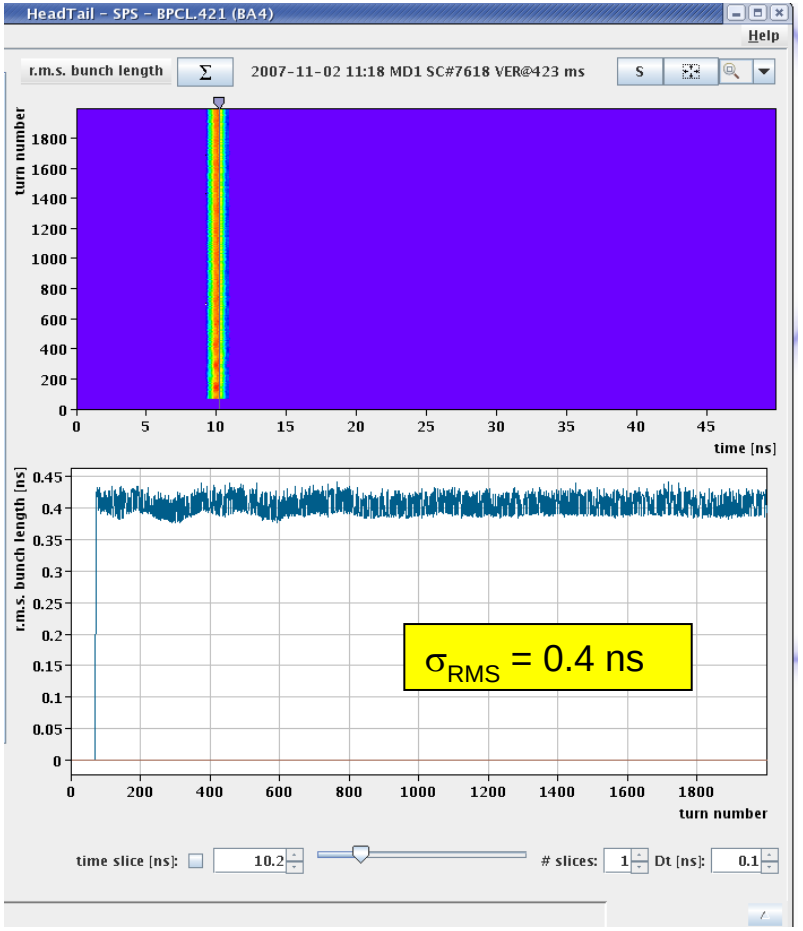
HeadTail Monitor (reconstruction)

Raw data

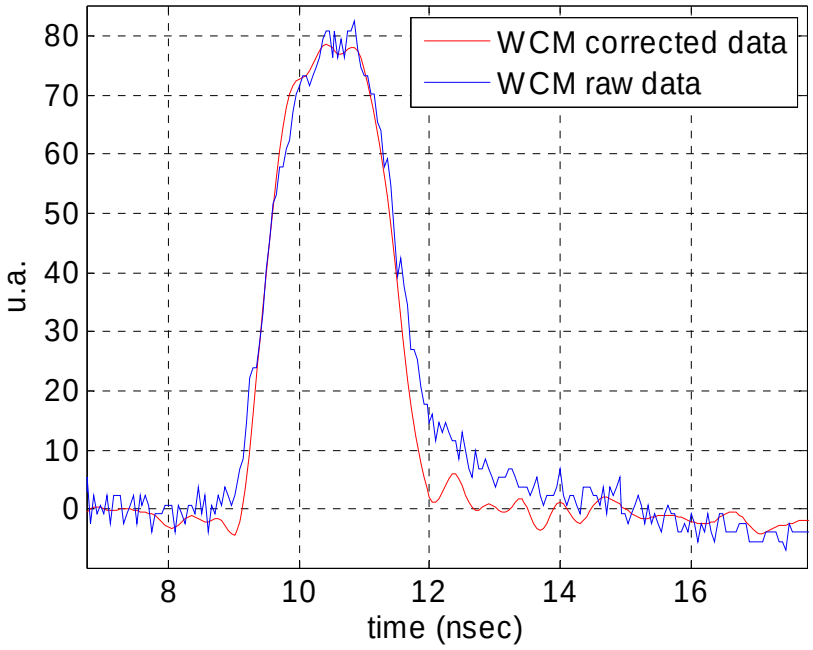


Reconstruction within the HeadTail Monitor application

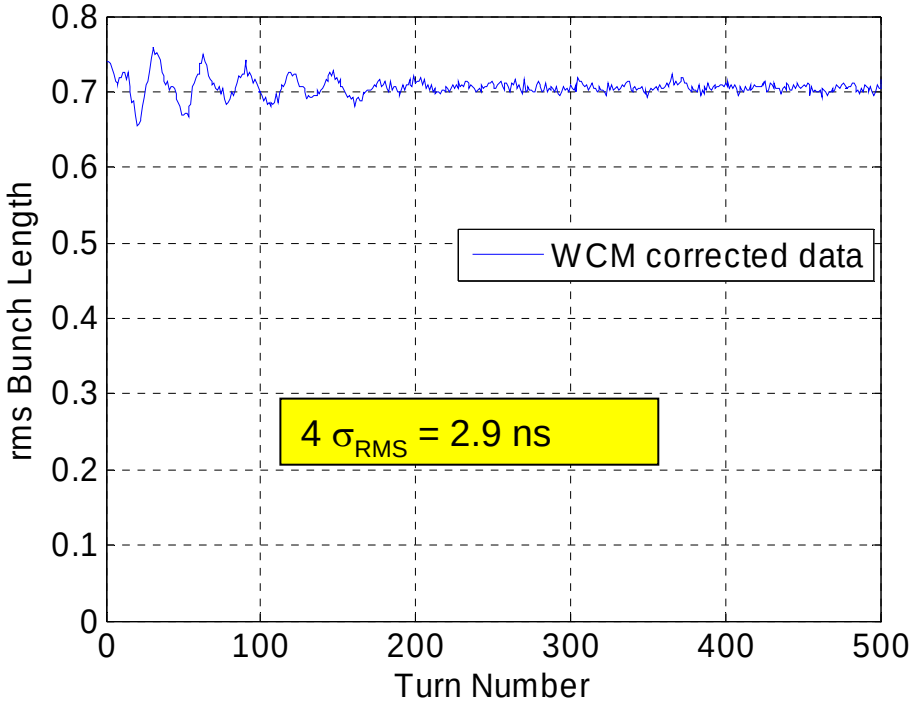
Reconstructed data



Wall Current Monitor (reconstruction)



Reconstructed data



Agenda

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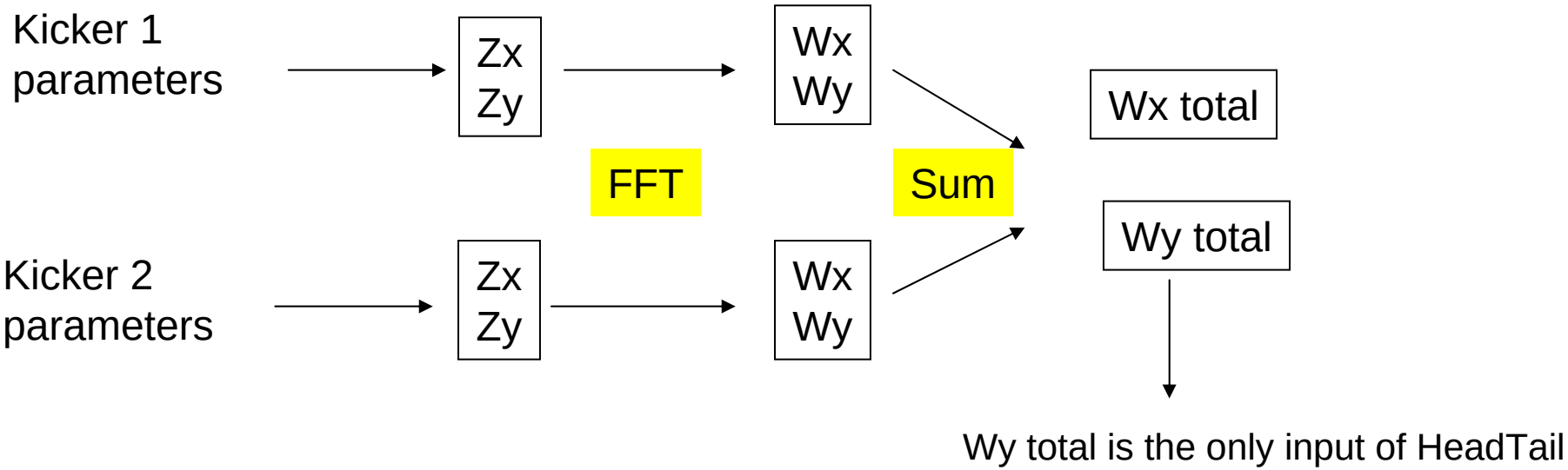
- 2007 Experiments: Bunch Length measurements
- Zbase: Issues with summing the impedance contributions

Zbase

- Wake field from all the kickers come from Hubert Medina's work on zbase：



2 issues:

a) Zx was actually Zx dipolar, so Yokoya coefficients were applied twice instead of once
b) This calculation only works if all kickers are vertical

Zbase

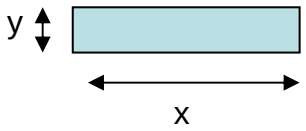
- Case of summing a horizontal and a vertical kicker:

$$Fx = K * (Wx_{dip} * x_{coherent} + Wx_{quad} * x_{incoherent})$$

$$Fy = K * (Wy_{dip} * y_{coherent} + Wy_{quad} * y_{incoherent})$$

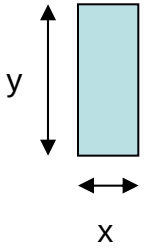
For specific geometries, Wxdip, Wydip, Wxquad, Wyquad can be obtained from the round case

Horizontal Kicker 1



$Wxdip = 0.4\ W^{round1}$
$Wxquad = -0.4\ W^{round1}$
$Wydip = 0.8\ W^{round1}$
$Wyquad = 0.4\ W^{round1}$

Vertical Kicker 2



$Wxdip = 0.8\ W^{round2}$
$Wxquad = 0.4\ W^{round2}$
$Wydip = 0.4\ W^{round2}$
$Wyquad = -0.4\ W^{round2}$

Wxquad, Wyquad and Wxdip can not be obtained from Wydip alone

$Wxdip = 0.8\ W^{round2} + 0.4\ W^{round1} \neq 0.5\ Wydip$
$Wxquad = 0.4\ W^{round2} - 0.4\ W^{round1} \neq -0.5\ Wydip$
$Wydip = 0.4\ W^{round2} + 0.8\ W^{round1} = Wydip$
$Wyquad = -0.4\ W^{round2} + 0.4\ W^{round1} \neq 0.5\ Wydip$

Zbase

- export all 4 wake fields from zbase
- Import them into Headtail