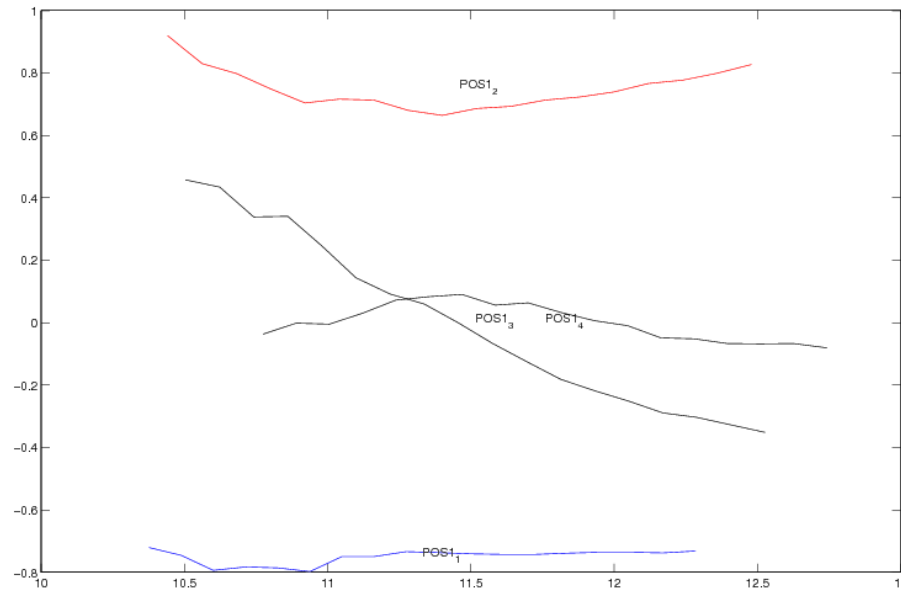


Walk-talk - S393 CFD stampede



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Lichtenberghaus, May 2013



Ingredients

(non)-CFD

t

log (e)

LSQR



Motivation:

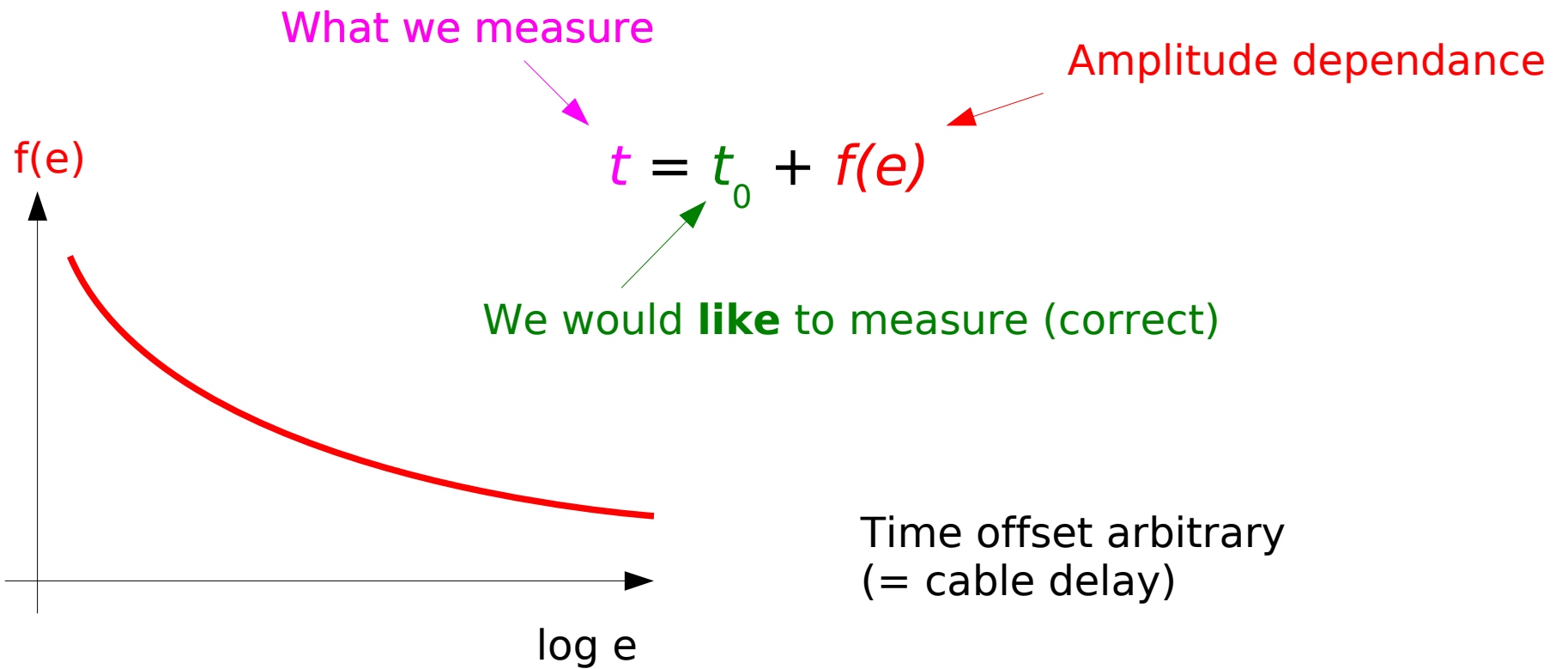
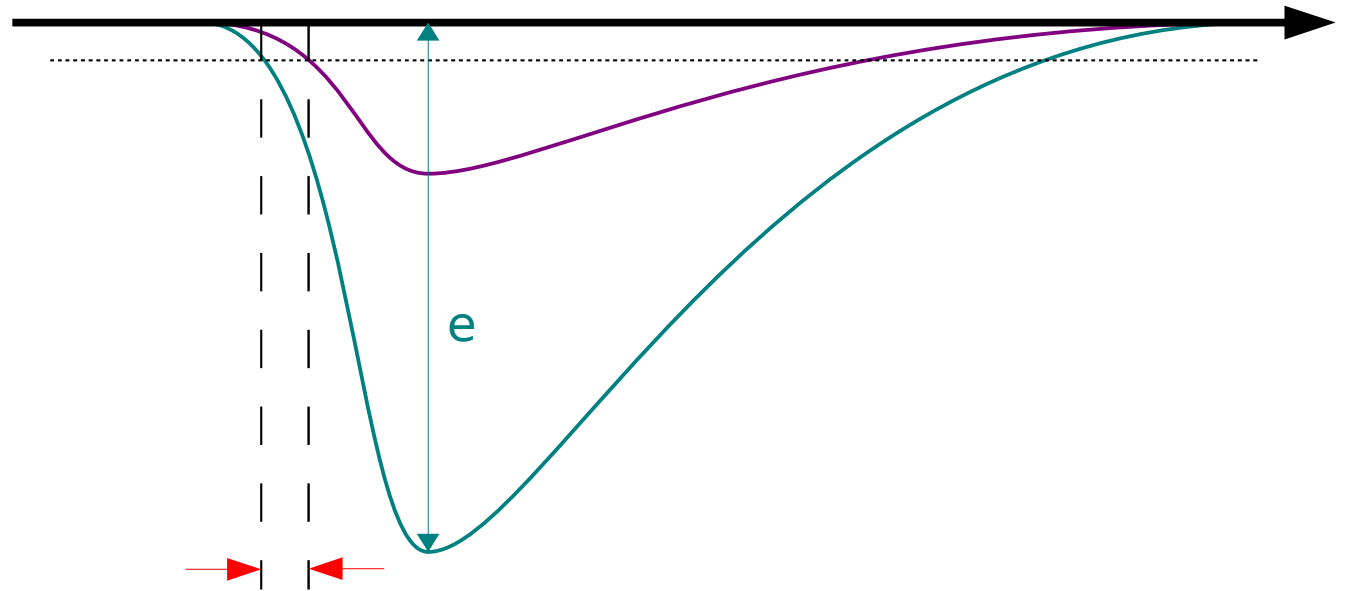
“Resolution is like money - you never have enough.”

A. Heinz



Walk

Amplitude-dependent
time measurement.



Determining the walk

$$t = t_0 + f(e)$$

Unknown \rightarrow cannot solve for $f(e)$

Combine several walk-functions

Assume time of hit (t_0) in both paddles the ~same:

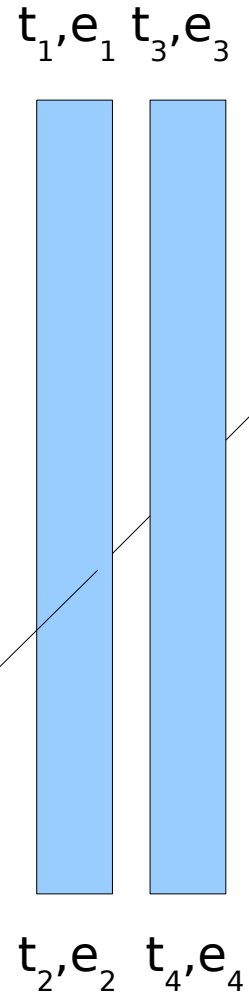
$$\begin{aligned} t_0' &= (t_1 + f_1(e_1) + t_2 + f_2(e_2)) / 2 + C_1 \\ &= (t_3 + f_3(e_3) + t_4 + f_4(e_4)) / 2 + C_2 \end{aligned}$$

Rearrange:

$$t_1 + t_2 - (t_3 + t_4) = - (f_1(e_1) + f_2(e_2)) + f_3(e_3) + f_4(e_4) + C'$$

+ Got rid of t_0

- Four walk functions.



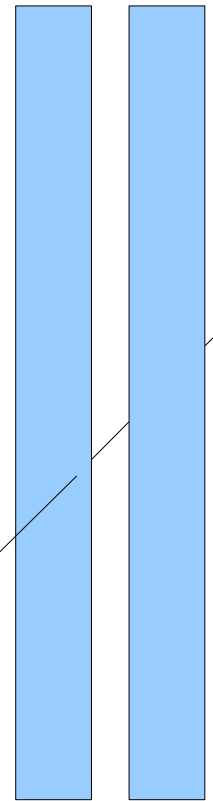
Isolating the walk from one channel

$$t_1 + t_2 - (t_3 + t_4) = - (f_1(e_1) + f_2(e_2)) + f_3(e_3) + f_4(e_4) + C'$$

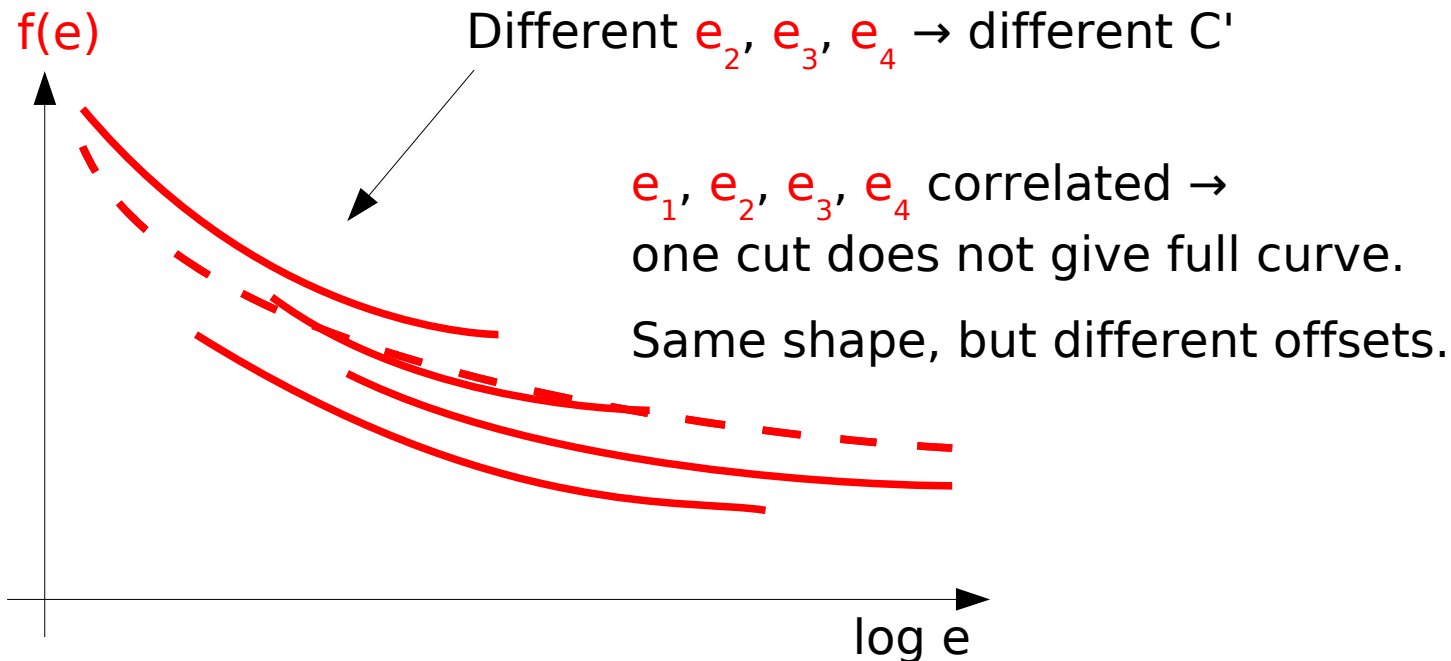
Keep e_2, e_3, e_4 constant.

$$f_1(e_1) = t_1 + t_2 - (t_3 + t_4) + C'(e_2, e_3, e_4)$$

t_1, e_1 t_3, e_3

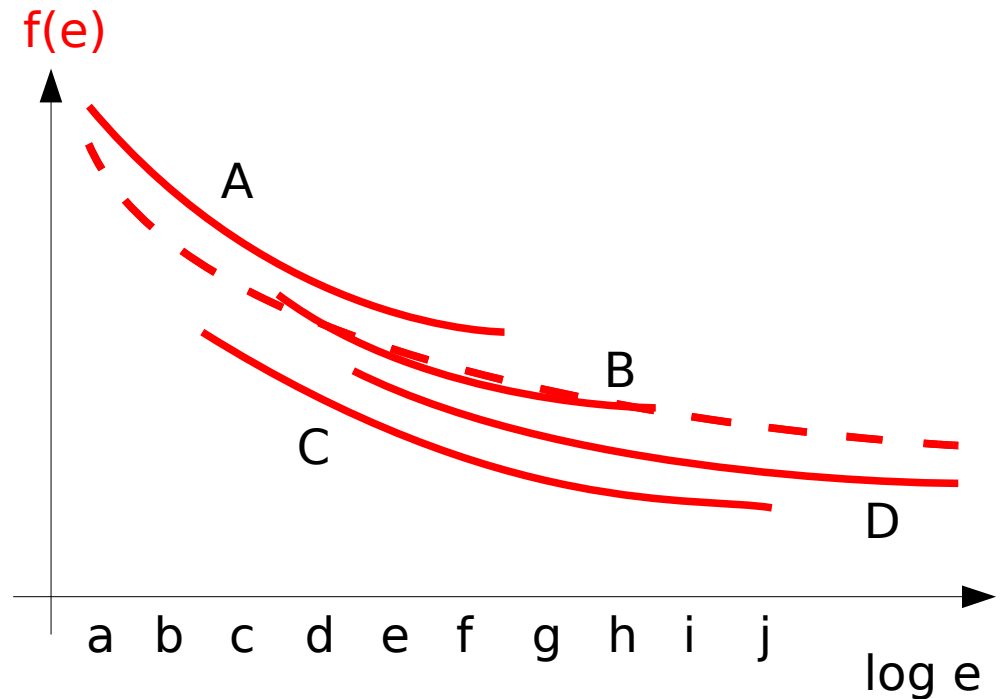


t_2, e_2 t_4, e_4



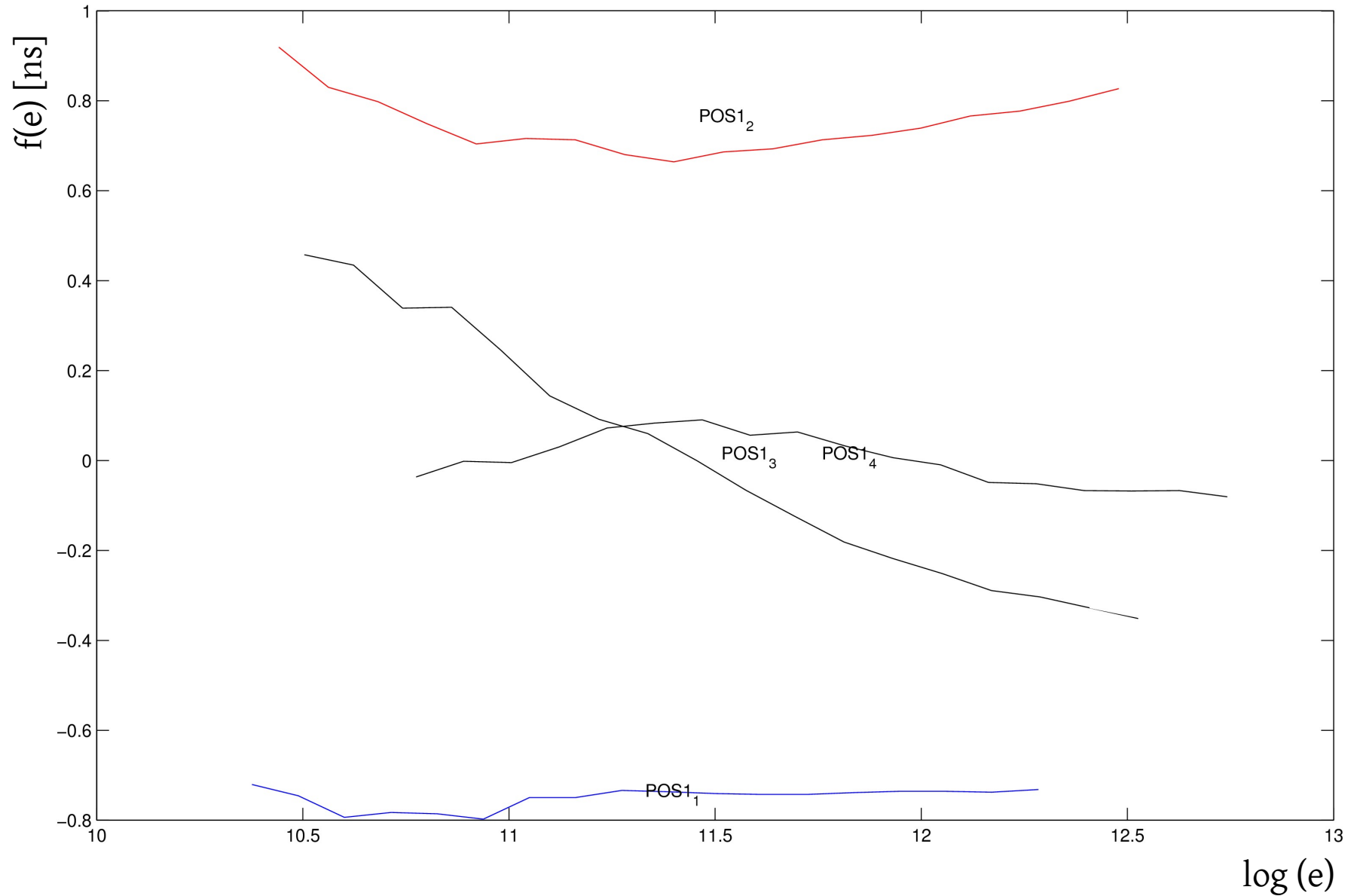
Combing partial walk-curves

$$\begin{aligned} f(e_a) - C_A &= t_{a,A} \\ f(e_b) - C_A &= t_{b,A} \\ f(e_c) - C_A &= t_{c,A} \\ f(e_d) - C_A &= t_{d,A} \\ f(e_e) - C_A &= t_{e,A} \\ f(e_f) - C_A &= t_{f,A} \\ f(e_d) - C_B &= t_{d,B} \\ f(e_e) - C_B &= t_{e,B} \\ f(e_f) - C_B &= t_{f,B} \\ \dots & \\ f(e_e) - C_C &= t_{e,C} \\ \dots & \end{aligned}$$

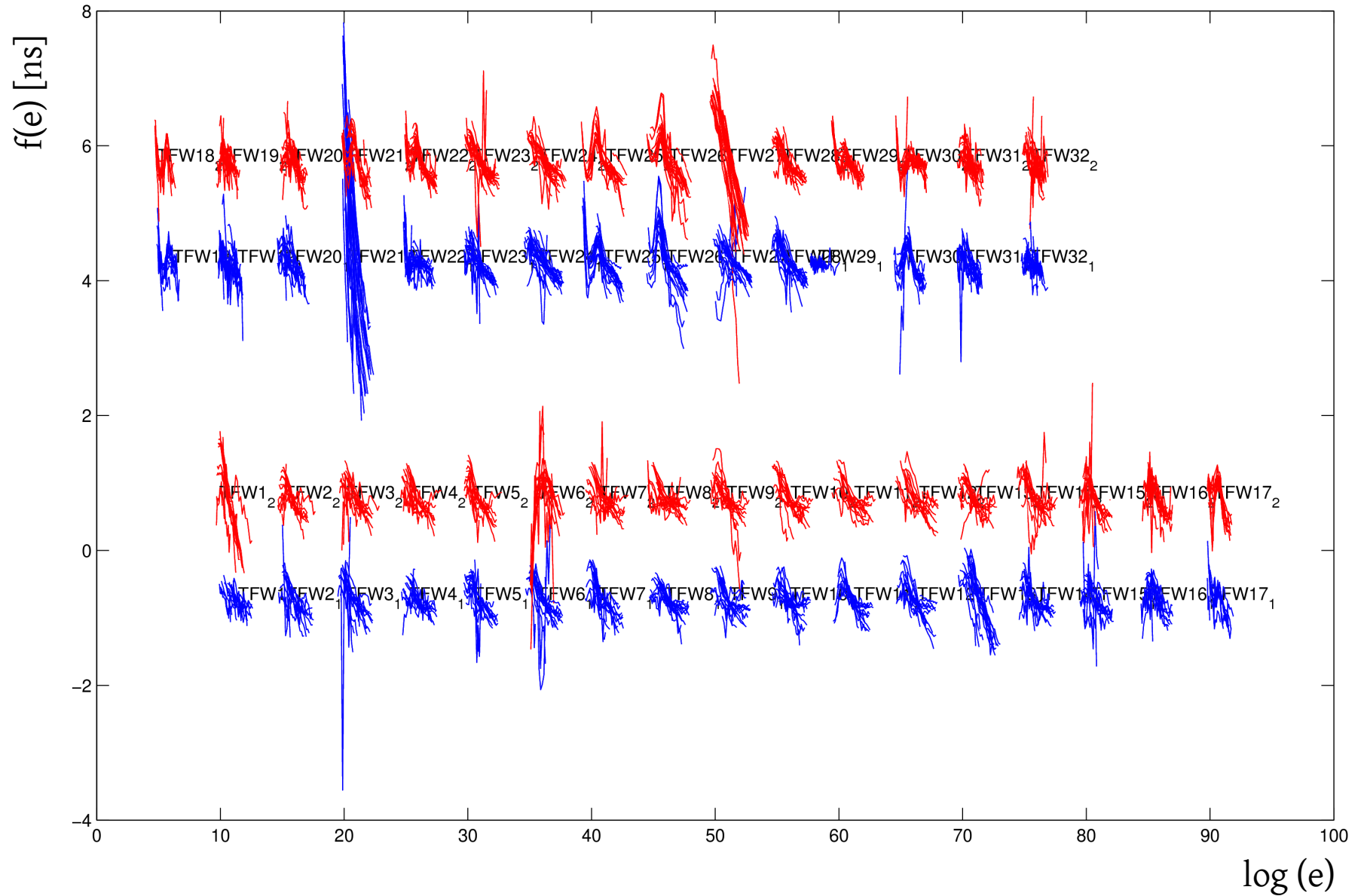


Linear least squares $\rightarrow f(e)$

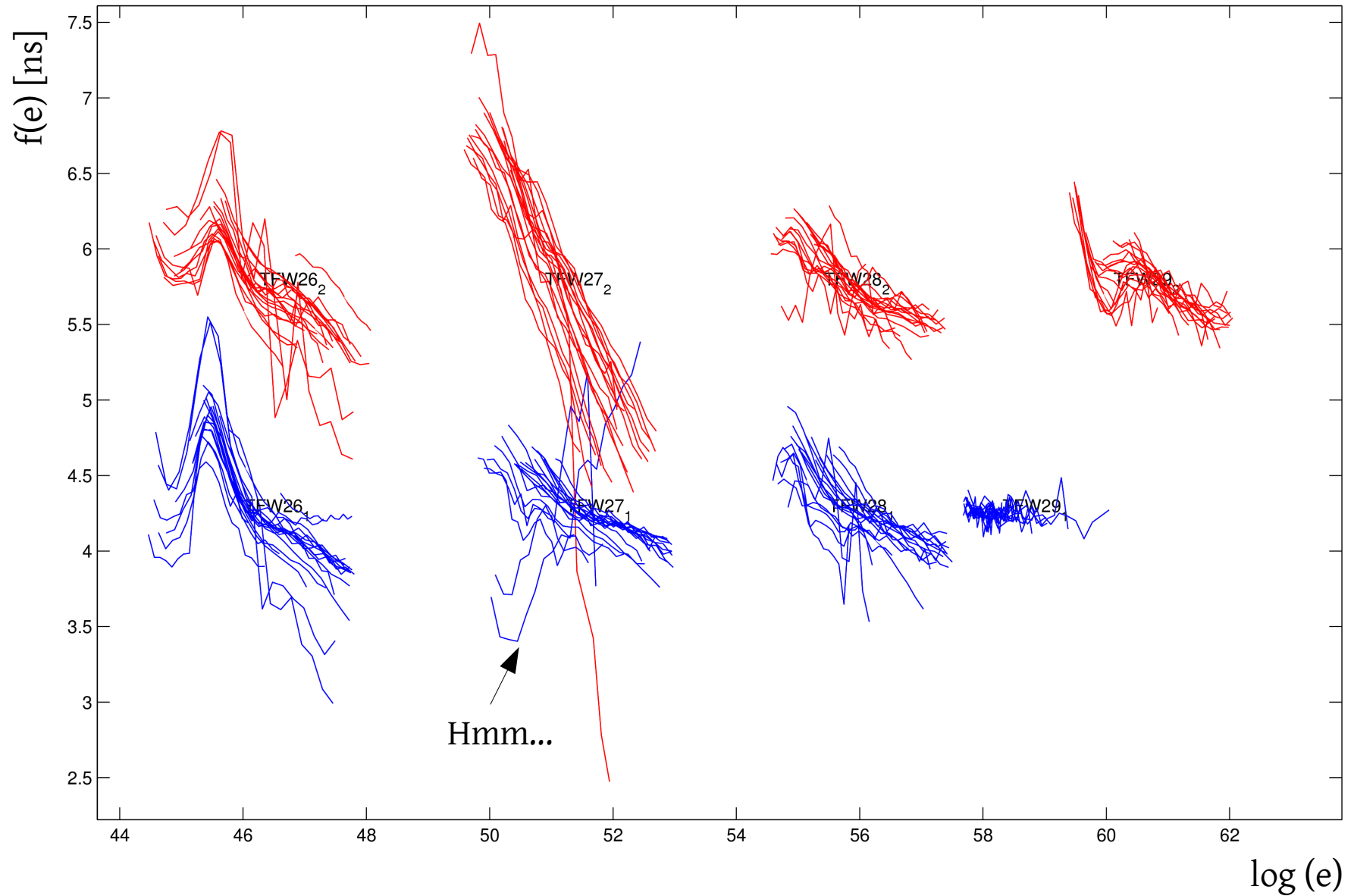
S393: walk POS - run24[2-5]



S393: walk TFW - run24[2-5]



S393: walk TFW – zoomed



More detectors, please

Wedge scin?

Finale...

- Walk is science – not fiction.
- Can determine walk from real data – real signals (Some suspicious points...)
- land02 has handling routines – unused...?

Thank you!