

The problem with ‘jumping emittances’:

Beam size measured by E-11 Horizontal wire during 36 proton injections changes by +/-5% depending on direction of fly.

E-11 Horizontal has other pathologies (eg distance to beam depends on direction of fly).

Is wire loose?

Is the Resolver used to measure the angle of the shaft broken?

Is the Resolver readout broken?

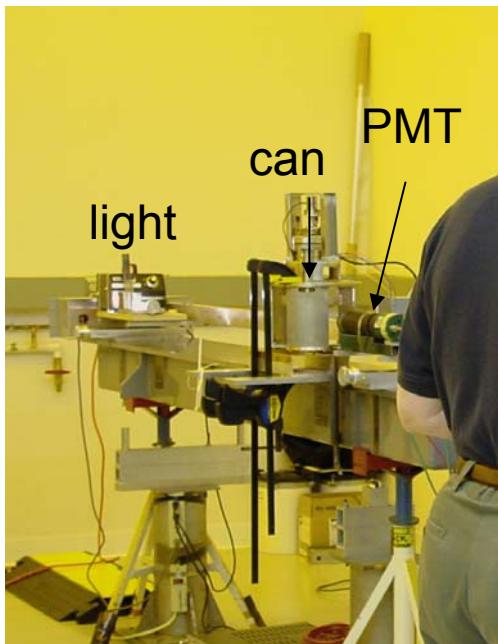
Need a system to measure wire-positions – John Krider (PPD) and Yuri Pischnikov (TD) have set up a system in Lab 3 and we have taken E-11 H there to be tested.

Not found anything wrong...

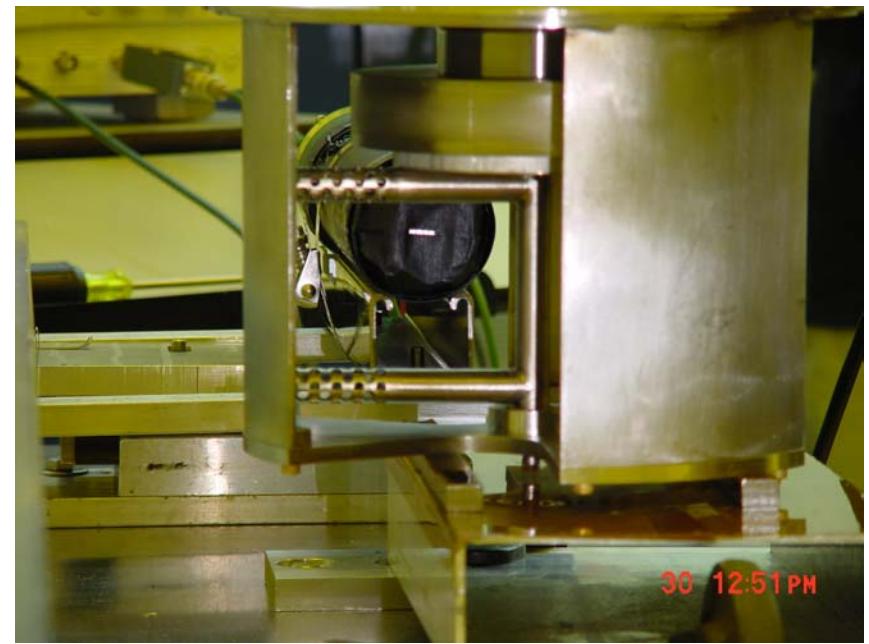
Schematic of setup in Lab 3.



The face of the PMT is covered except for 5 slits of 25 microns spaced by 2225 microns. When the wire passes between the light and a particular slit, the PMT output is reduced. The R(esolver) gives 4096 pulses per turn.

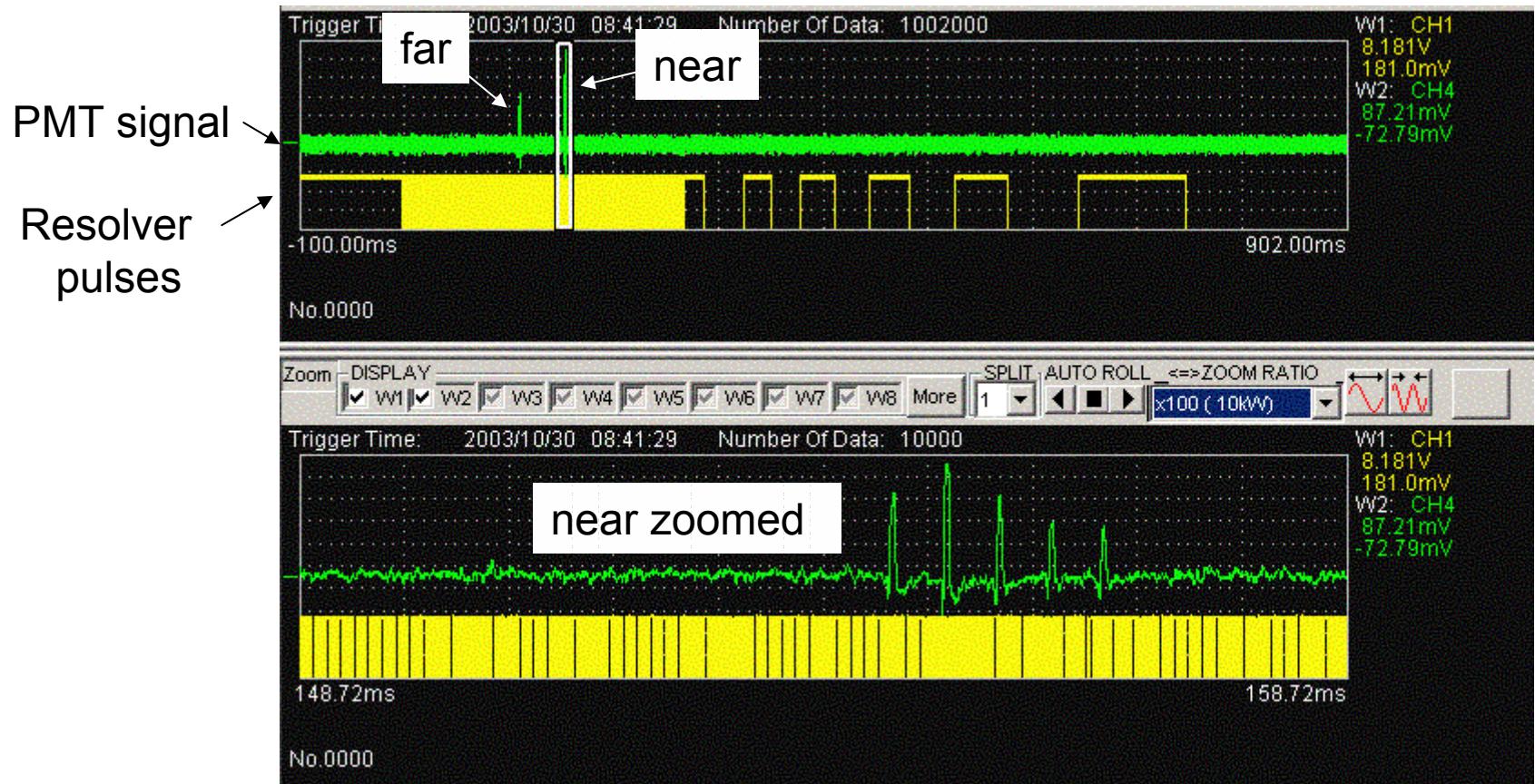


general view



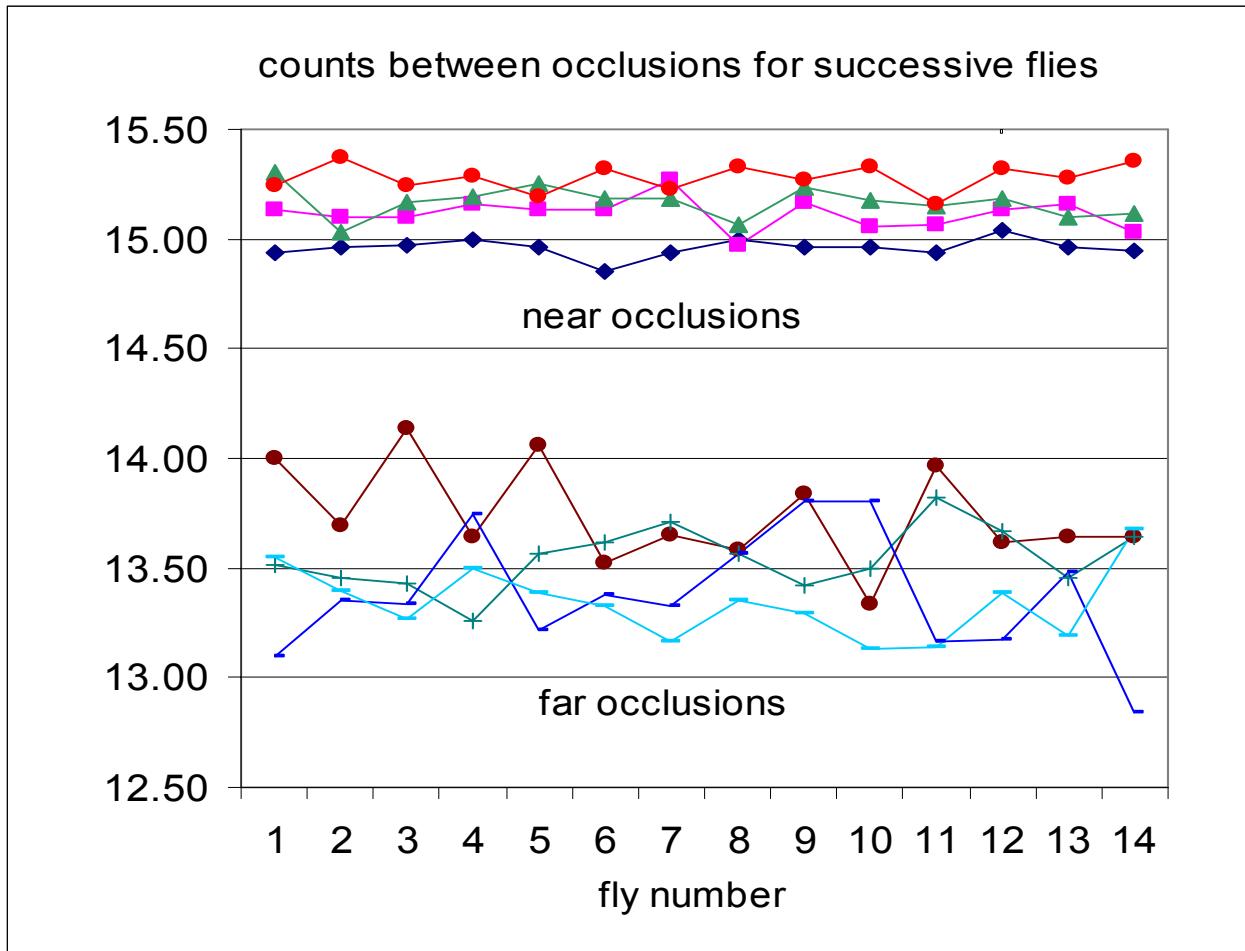
close up of PMT and fork

Typical data set showing far and near occlusions



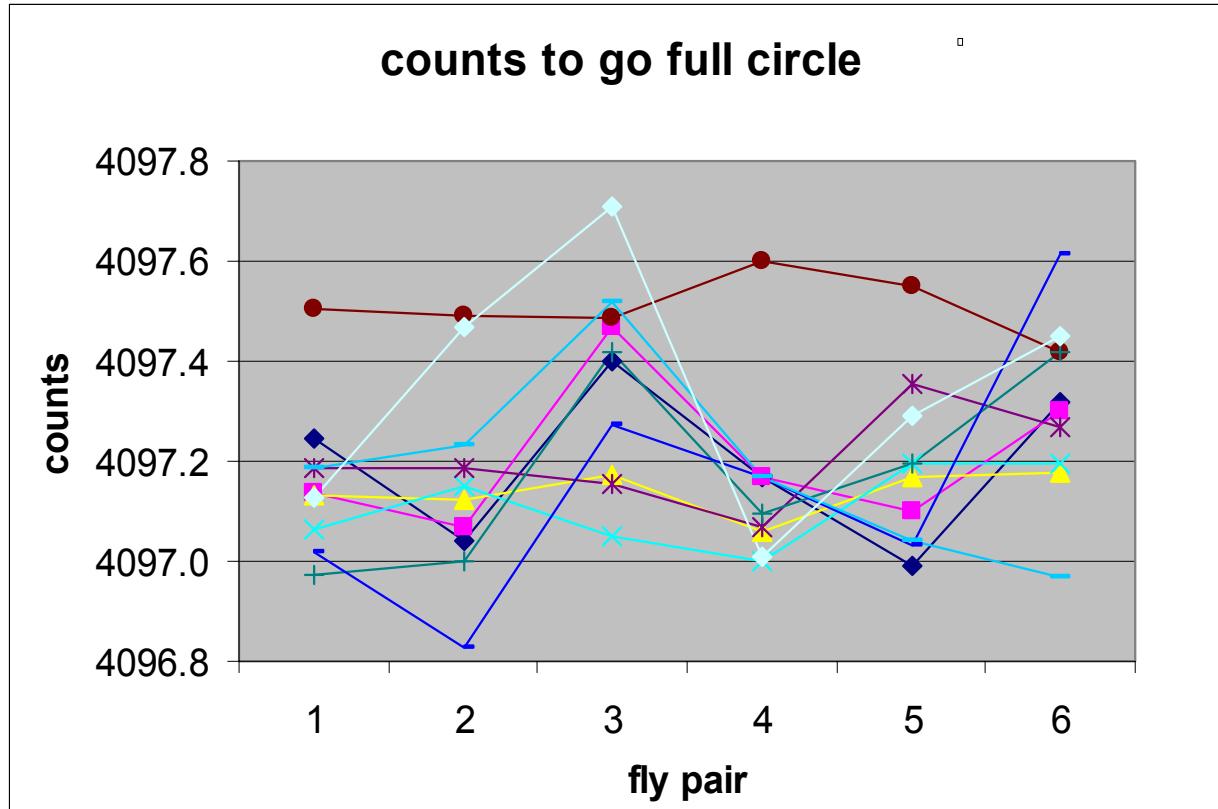
Peaks are identified and matched with the number of Resolver pulses

Blue is 1-2
 Pink is 2-3
 Green is 3-4
 Red is 4-5



Slit 1 is lowest slit on diagram – difference (2%) between blue and red sets is due to curvature of path of the wire in front of straight PMT slits.

Using clockwise and counter clockwise flies gives the counts to go full circle to each occlusion (there are 10 occlusions). The number of counts should be 4096.



Nice system – credits to John Krider and Yuri Pischalnikov. Darryl Orris wrote the peak finder. Apart from usual suspects, (Jim Zagel) Nathan Eddy, helped with data taking and is pursuing this issue, too.

Plan:

Reinstall can as is:

Develop asap new fork which carries two wires at known circumferential separation;
(eg 1 cm) for in-situ calibration of angle scale. (Software and mechanical issues)

(Make one of these a 7 micron wire cf existing 30 micron wire to reduce losses.)