Timing Calibration PS Triggers

GlueX Global timing offsets for PS and tagger

Detector Hit time

Microscope Hit time:

double T = locTTabUtilities->Convert_DigiTimeToNs_F1TDC(digihit) - tdc_time_offsets[row][column] + t_tdc_base;
*T -= c1*pow(1/(P+c3),c2) - (t0 - c0); // walk correction*

PS Hit Left/Right time (has no TDC):

double T = (double)digihit->pulse_time;
hit->t = t_scale * T - GetConstant(adc_time_offsets, digihit, psGeom) + t_base;

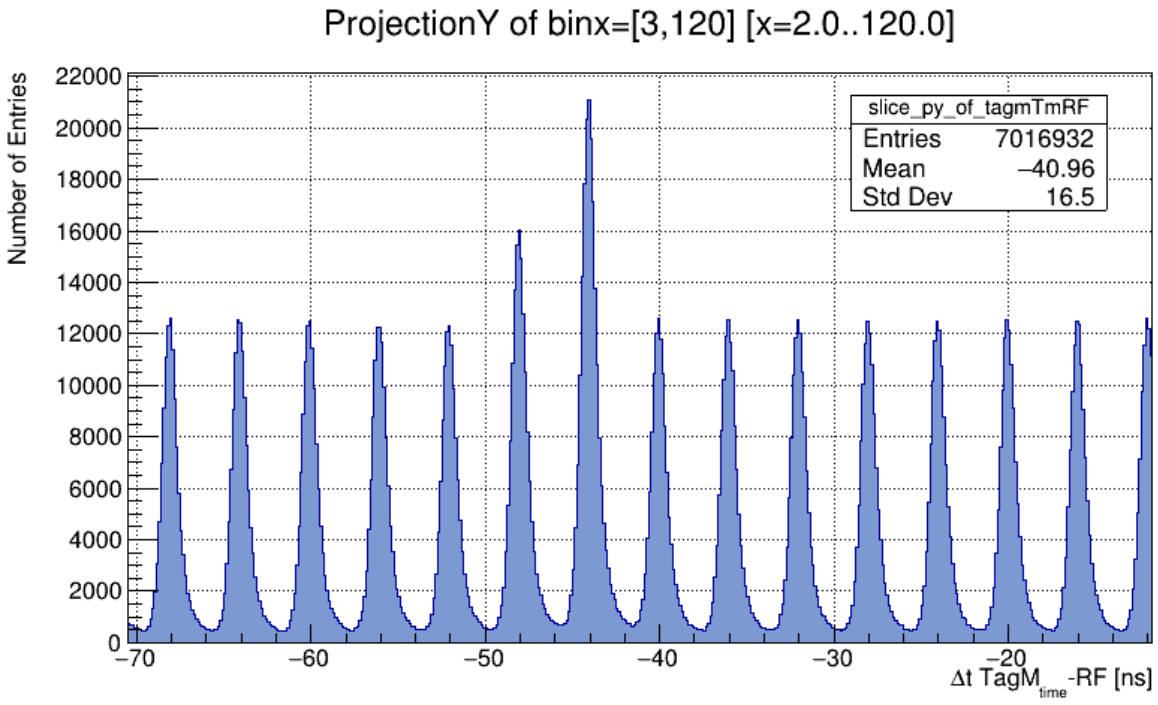
PS Pair has two Hit times one for Left Arm and one for Right Arm:

double tpair = (PSPairs[0]->ee.first->t + PSPairs[0]->ee.second->t) / 2.;

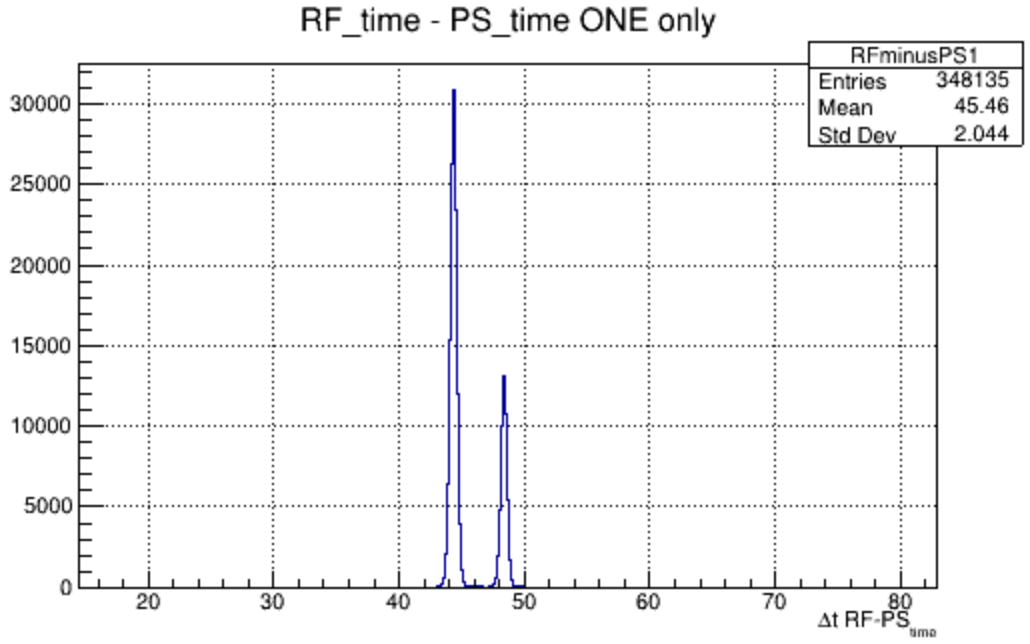
In all these detectors the "global timing offset" is additive
while the "individual detector offset" are subtractive

Tagger and PS timing w.r.t. RF

These are PS trigger events and looking at the time difference between RF and the tagger and PS hits:



Tagger Microscope time minus RF time



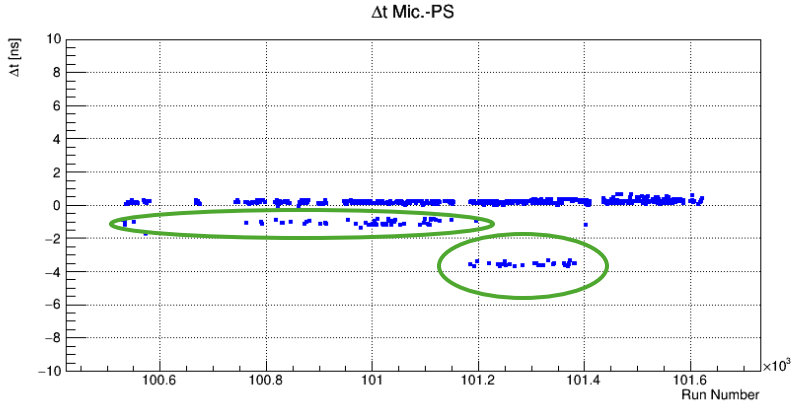
RF time minus PS pair times

Note: The PS trigger is established by the course counters while the PS pair time is determined by the left/right pairs of fine counters. The "double" peak structure is always seen (feature of PS trigger)

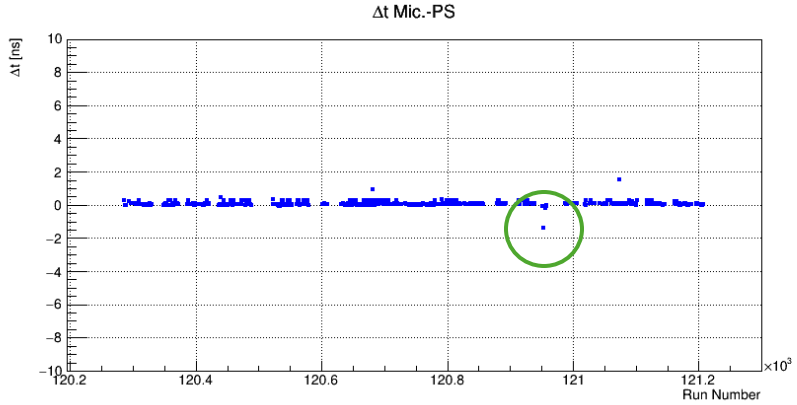
Observable to grade timing calibration

Here we consider only PS trigger events and look at the time difference between tagger timing hits and PSpair(s)

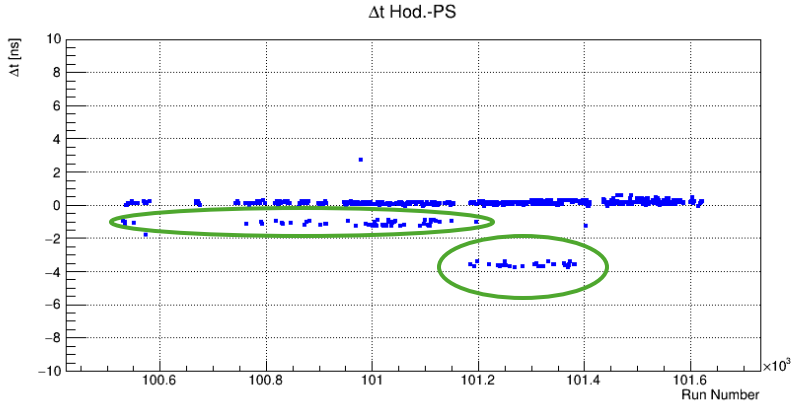
Summer 2022

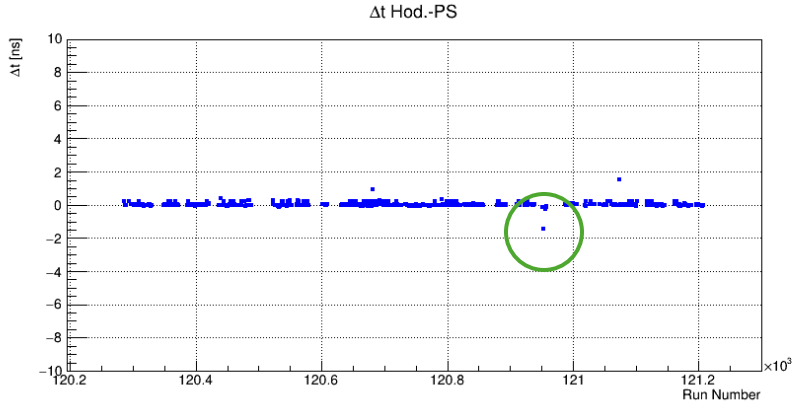


Winter 2023



Microscope

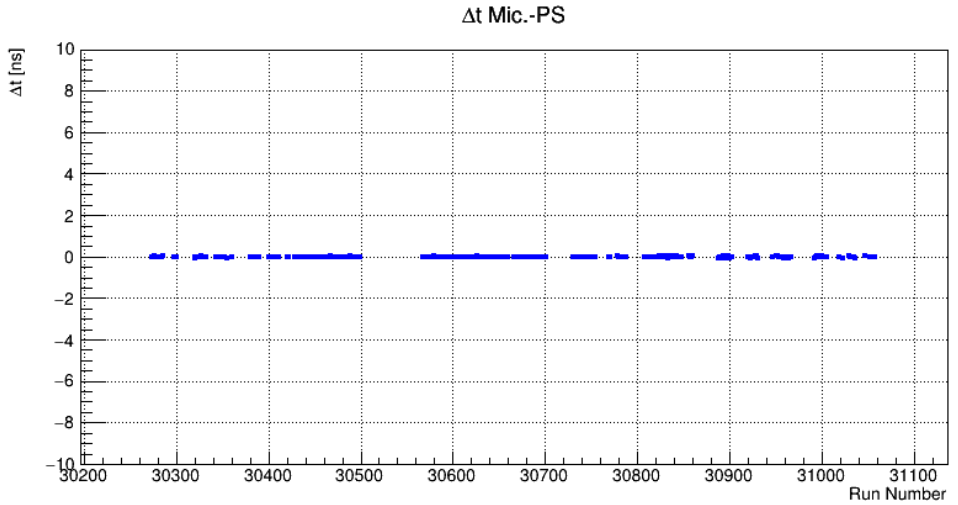




Hodscope

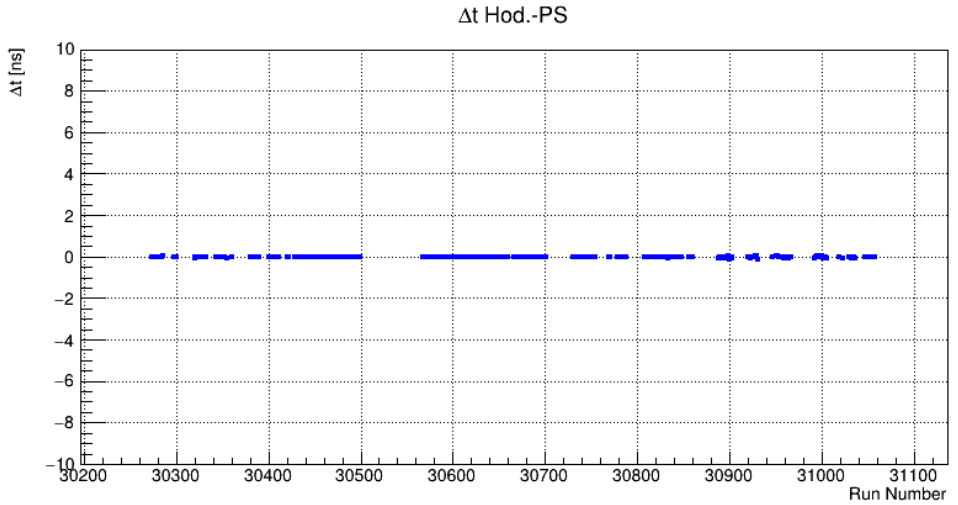
Deviations from zero are indicative of issues with the global timing offset. If seen in **both taggers** the issue is most likely in the PS global offset

And for Spring 17 currently used calibration



Microscope

That is how it should look like



Hodoscope