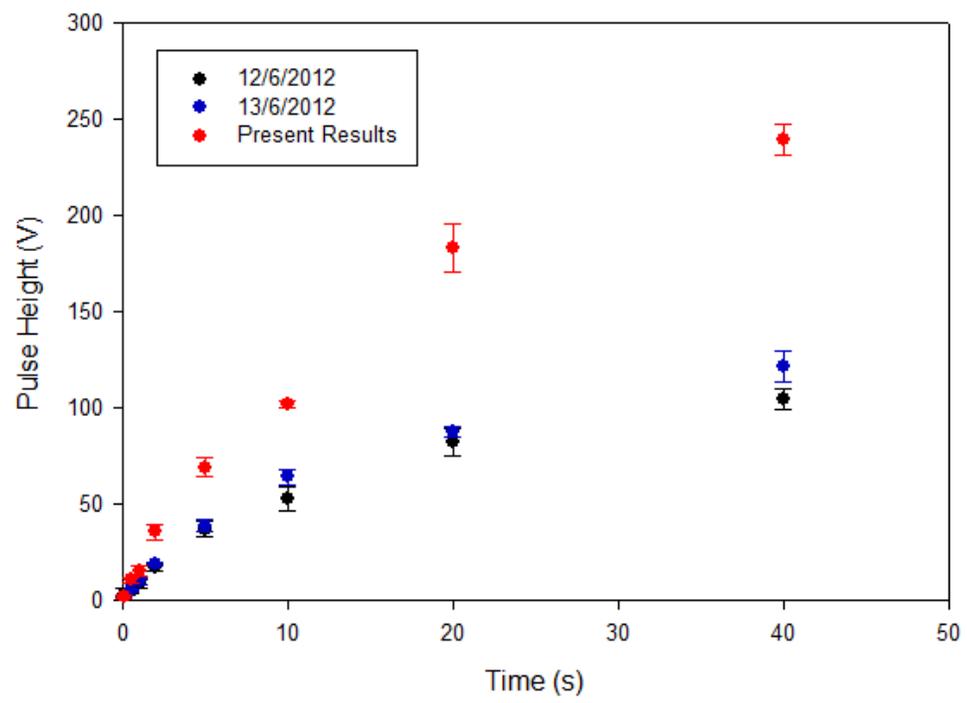


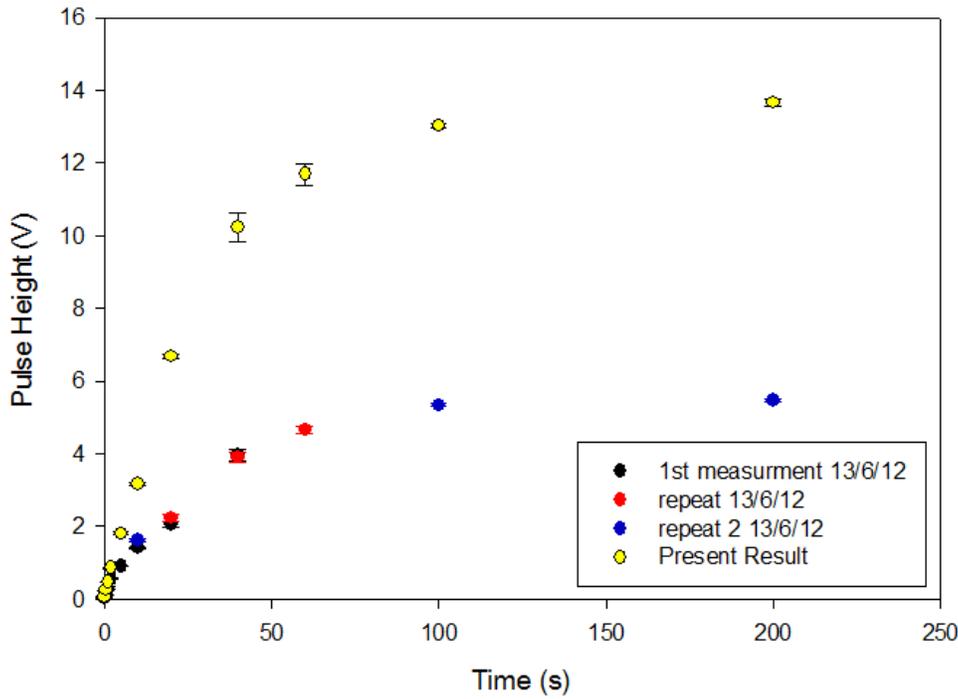
Dear All,

After 2 solid days of frustration, trying to understand why both the CsI signal and MCP signal were low, everything worked! Two things were changed last night which may have solved the problem firstly, the cryostat was heated up to 300K to remove any deposited N₂, however, no large pressure increase was observed above 100K. Secondly, the pressure in the compressed air line that controls the lead plug was increased, the travel of the manipulator doubled. After growing a moderator this morning, the DC beam was ~420 counts per second, a factor of 2 higher than the last two days.

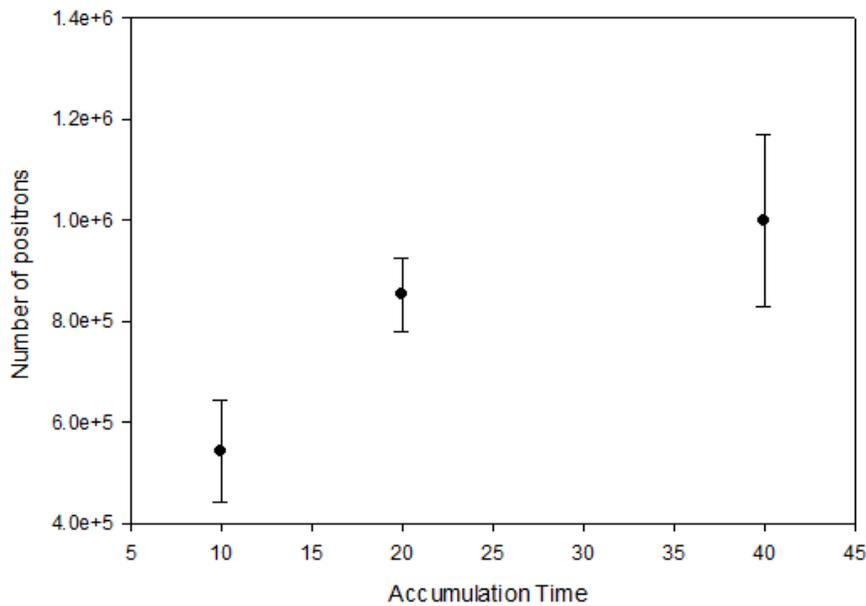
The CsI signal was higher than previously observed, compare the red points with the blue and black in the graph below (note that the amplifier now saturates at t>40(s) and is already on the lowest gain setting)



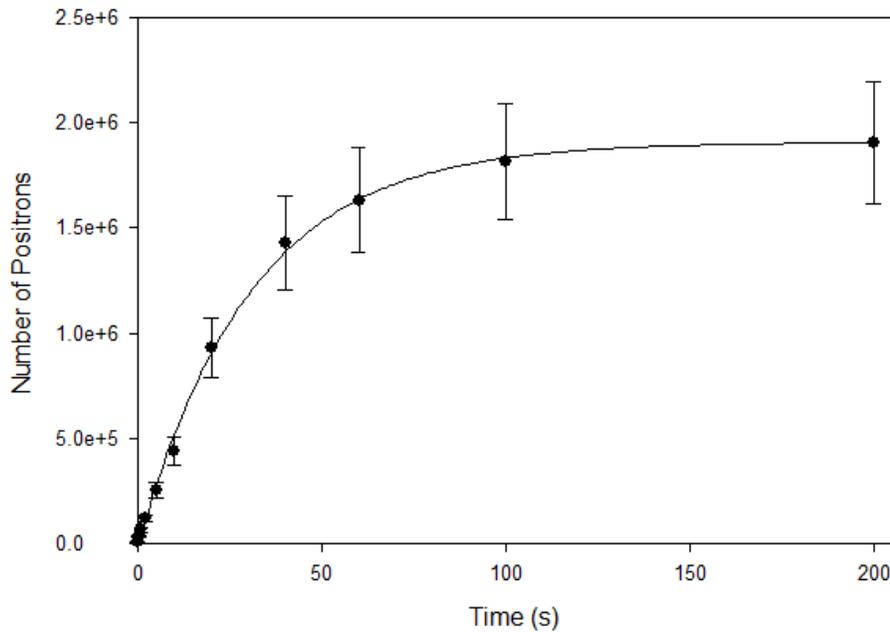
The MCP signal was also higher, compare the yellow points with the combined red blue and black points from the last normal measurement in the plot below.



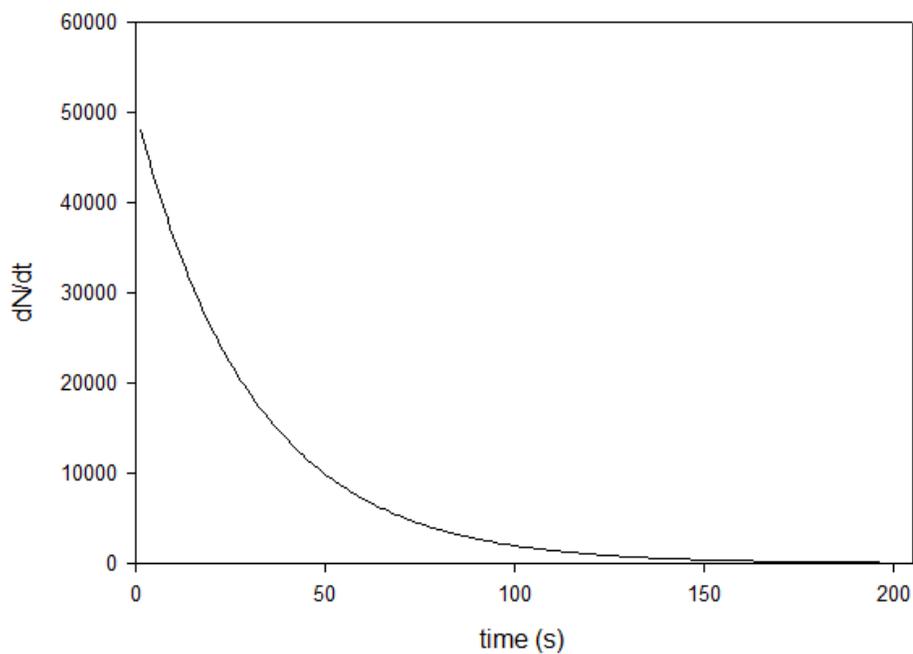
I began to take measurements using the charge amplifier (with 18V front bias, back floating, measured in the area with a short cable and the oscilloscope on 1M Ω) to measure the deposited charge and observed a change in signal with increasing accumulation time



I was able to find a conversion factor between MCP pulse amplitude and number of positrons which gave the following result for the number of positrons vs accumulation time (the difference in number between the above and earlier measurement is due to a change in pressure, I have not had a chance to optimize the pressure for longer times due to the problems of the last two days. It appears that at longer times, a lower pressure $\sim 2.2 \times 10^{-1}$ torr is better).



Differentiating the fit gives the following for dN/dt



30-40s accumulation time may be most efficient.

These are the first estimations of the number of positrons and should be viewed as preliminary. I have not had a chance to fully optimize the parameters of the trap to fully maximize the number. However, if the above is correct then we should have enough positrons to start working on transferring them to the cusp trap.

As always, comments, questions and suggestions welcome.

Kind regards

Dan

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