Ion and radioactivity acquisition for GET
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This document gives some solutions for the GET architecture to minimize the dead time between ion implantation and a possible 2p radioactivity. Available documents for references:

Email from W. Mittig (Ap 4th, 2009)

Proposal for the readout of two consecutive events, P. Baron, E. Delagnes , Ap 7th, 2009

The AGET chip, P. Baron, Caen workshop, March 2009

1) Discussion on the 2 proposals from W. Mittig
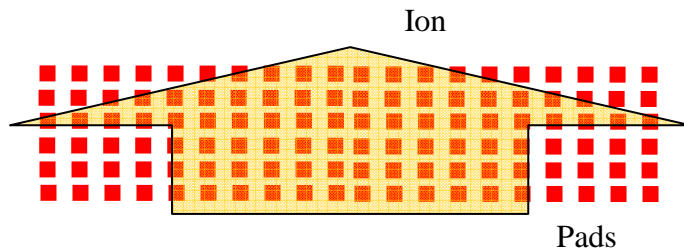
First case: Ion event is stored then sent to DAQ before 2p radioactivity

Readout time:

512x [n channel + 3]xTrck + 79xTrck = 64.6 µs + 20.48 µsxnchannel

[Trck = 40 ns]

From our TPC measurements, we know that the track is about 4cm wide -> 20 pads/AGET fire, if AGET is perpendicular to ion trajectory.

20 channels → Readout time ≈ 540 µs

This solution does not match with the minimum dead time we want.

Second case: In the same event we store ion implantation and radioactivity in AGET.

The drift time is 5cm/µs, the pads resolution will be 2mm. So we want to have a similar resolution for the time, i.e. 40 ns for a drift time of 5 cm/µs. So the Write frequency must be 25 MHz → at any time we have only the last 20 µs (512 channels) in the AGET SCA.

This time range is too short.

2) Using the 2 buffers /AGET (P. Baron & E. Delagnes proposal)

This solution seems to be the best. The dead time after a full treatment (ion + radioactivity) is not critical, so AGET can work with only one hit channel register for 2 events.
However, if after a programmable delay there is no radioactivity, the readout must be performed. Minimum value for the delay 100μs, maximum 10 ms. Such a delay is absolutely necessary to readout an event, when there is no decay which follows an implantation.
The readout of both memories should be done when either the second trigger is there (radioactivity event registered) or the delay is pasted…
For the threshold, the minimum is 6 x rms noise → threshold min ≈ 15000 e-.