Projet EUROGAM

On line analysis software requirements

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This note presents the preliminary reflexions on the on line event analysis of the french community involved in the EUROGAM project. It outlines the main requirements in that field and gives an indication on the conditions the event processor unit has to fulfill.

Description of typical analysis procedure during the experiments.

In the on line analysis we have to distinguish two main stages:

- The first one is relative to the creation of various one and two dimensional spectra. It is essential to be able to built in direct mode and with conditions on the ADCs (energy, time, fold, sum energy...) different distributions like germanium energy, time, multiplicity, sum energy,multiplicity versus sum energy and gamma energy versus multiplicity. These informations have to be available for different exit channels selected either on criteria previously mentionned or by means of additionnal counters (recoil separator, particle detectors...). Due to a high number of spectra it is necessary to have a clear interactive display of the various sorting conditions based on lookup tables. First priority must be given to the constitution and the graphic representation of direct and conditionned one dimensional spectra. The second priority would be the constitution and the display of two-dimensional distributions on which we want to be able to define energy gates in order to obtain the corresponding one dimensional spectra.

- The second stage concerns the analysis of the conditionned spectra with programs and graphics tools used up to now at Daresbury (cf. the note "userdoc" of Data analysis section 4. Ed.4.1 27/09/84) and Strasbourg.

It could be of interest to have during the experiment the possibility of analysis of high fold events. We have in mind that this sorting processes only after gain matching for the Ge and selection by fold tresholds. Let us consider for example the case of five fold events. To identify a nucleus or a reaction channel it is necessary to select at least two gamma rays in coincidence. The selection on the gamma energy has to be performed for each event on the five touched Ge counters. It could be useful to extend this procedure to four or five kind of nuclei produced in the reaction. For each identified product a two dimensional spectrum (E(4K)* E(4K)) is then built up event by event from the informations delivered by the three others ADCs. If we want to define two set of conditions on each nucleus this leads to the creation of 8 or 10 matrices (4K*4K) and a lookup table which contains the various sorting gates. The next step is to project the resulting matrices on various axis and to store the corresponding one dimensional distributions in direct memory. Again graphic tools and analysis programms are essential. This treatement allows to check the threshold of the fold of the events taken into account by the event builder and yields informations available immediately. A more accurate evaluation of the data can be obtain with additionnal programms allowing for example to substract the background in the constituted matrices. These kinds of data reduction can be performed on the registered data (disk or tape) and nowadays it has presumabely to be considered as a quasi on line analysis.

In addition a selection of the Ge counter pattern may be of interest to the users. It is also necessary to have access permanentely to the rate of events analysed by the sorter. For all the distributions (one or two dimensional) obtained during the measurement we require the possibility to store both on disk and tape. A fast hard copy of the screen is also needed.

It is clear that the data processings on and off line are strongly correlated but in a first stage it is crucial to have access to a minimum of graphic tools to be able to perform a reliable software analysis in order to monitor the quality of stored data.

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