Contribution ID: **260** Type: **Poster Presentation**

Data Processing System for the Time-of-Flight Spectrometer of Heavy Ions in the wide range of Energies.

Wednesday, 9 July 2014 17:10 (1h 50m)

Abstract content
   (Max 300 words)
Formatting &
Special chars

At the present moment it is well known that detecting fission fragments from a decay of heavy nuclei using silicon detectors comes with two experimental challenges, namely Pulse Height Defect and Plasma delay. The negative effect of the Pulse Height Defect (PHD) is observed when registering the energy of the fission fragment and the one of Plasma Delay (PD) is observed when registering time of the fission fragments using the silicon detectors. Finding a solution to these experimental challenges is critical to the investigation of the new decay of low excited heavy nuclei called "Collinear Cluster Tri-partition" (CCT)[1].

A precise but rather complicated procedure that takes into account the above mentioned experimental challenges (PHD and PD) has been successfully developed. This procedure involves an iterative process where the correct masses of fission fragment is calculated taking into account both PHD and PD in the measurement of energy and Time Of Flight (TOF) respectively. This procedure is divided into 3 stages. The first stage is the first approximation where the energies of the fission fragment is calculated without taking into account the PHD and the PD. The second stage is the calculation of the PHD value using an empirical formula derived by Mulgin et al [2]. The last stage involves using a special equation suggested by Neidel and Henschel [3] to calculate the PD. In this way, the correct PD values are obtained and are then used to calculate the correct TOF for fission fragments.

A special code to perform the abovementioned procedures was first designed in Fotran 95 programming language. At the moment a newly improved and modern code is currently being developed in C++ programming language. This modern code also includes a design of an easy to use graphical interface that runs the iteration used to find the parameters without compiling. In this paper we present both the description of this analysis procedure and a detailed explanation of this modern code.

References

1. Pyatkov Yu.V. et al.,Eur. Phys. J. A 48 (2010) p 94
2. Mulgin S. et al., NIM A 388 (1997) p 254-259.
3. Neidel H, Henschel H., Nucl. Instr. Meth. 178 (1980) p137 - 148

Apply to be
 considered for a student
   award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
   PhD)?

PhD

Main supervisor (name and email)
and his / her institution

Dr N.M. Mkaza
Stellenbosch University
Faculty of Military Science

Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?

Yes

Primary author: Mr MALAZA, Vusi (Stellenbosch University)

Co-authors: Dr KAMANINI, Dmitry (Joint Institute for Nuclear Research); Dr JACOBS, Noel Mkhululi (Stellenbosch University); Prof. ZHUCHKO, Vladimir (Joint Institute for Nuclear Research); Prof. PYATKOV, Yuri (Joint Institute for Nuclear Research)

Presenter: Mr MALAZA, Vusi (Stellenbosch University)

Session Classification: Poster2

Track Classification: Track B - Nuclear, Particle and Radiation Physics