Contribution ID: **148** Type: **Sectional**

NEUTRON GENERATORS AND DAQ SYSTEMS FOR TAGGED NEUTRON TECHNOLOGY

Tuesday 26 September 2017 15:30 (15 minutes)

At the T(d,n)He4 reaction each 14 MeV neutron is accompanied by a 3.5 MeV alpha- particle emitted in the opposite direction. A position- and time-sensitive alpha-detector measures time and coordinates of the associated alpha particle which allows determining time and direction (tags) of neutron escape. The tagged neutron technology is based on a time and spatial selection of events that occur when a tagged neutron moves through the object. The ING-27 neutron generators produced by VNIIA provide high intensity of tagged neutrons in a wide cone angle, the high spatial and time resolution of tagged the neutrons is provided by the pixelated alpha-detector. The requirements to DAQ system for various tagged neutron devices are reported. The architecture and parameters of DAQ system based on preliminary online selection of signals by analog front-end electronics and transmission of only useful events for subsequent computer processing are considered. The examples of tagged neutron devices for various applications are considered.

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Session Classification: Detector & Nuclear Electronics

Track Classification: Detector & Nuclear Electronics