

# DELAYED NEUTRON YIELD MEASUREMENT ON THERMAL NEUTRON INDUCED FISSION OF $^{237}\text{Np}$ USING CROSS-CORRELATION TECHNIQUE

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The measurement procedure based on the continuous thermal neutron beam modulation with a mechanical chopper was developed for delayed neutron yield measurement of the thermal neutron induced fission of  $^{237}\text{Np}$ . The idea of the procedure is similar to that, widely used in modern computer communications for the non-authorized data access prevention. The data is modulated with predefined pattern before transmission to the public network and only recipient that has the modulation pattern is able to demodulate it upon reception. For the thermal neutron induced reaction applications the thermal neutron beam modulation pattern was used to demodulate the measured delayed neutron intensity signals on the detector output, resulting nonzero output only for the detector signals correlated with the beam modulation. The comparison of the method with the conventional measurement procedure was provided and it was demonstrated that the cross-correlation procedure has special features making it superior over the conventional one especially when the measured value is extremely small in comparison with the background. Due to strong sensitivity of measurement procedure on the modulation pattern of the neutron beam one can implement the modulation pattern of specific shape to separate the effect of the thermal part of the beam from the higher energy one in most confident way in the particular experiment. The remarkable property of our method is related to the unique possibility of separation the effects caused exclusively by the thermal neutrons using the neutron TOF measurement available on the IBR-2 pulsed reactor.