Investigation of the high energy γ-rays accompanying spontaneous fission of ^{252}Cf in double and triple neutron-γ coincidences.

N.V. Eremin[1], S.S. Markochev[2], A.A. Paskhalov[1] ,
G. Mandaglio[3], M. Manganaro[3], G. Fazio[3], G. Giardina[3]

[1]*Skobeltsin Institute of Nuclear Physics, Lomonosov Moscow State University, 119899 Moscow, Russia*
[2] *Moscow Institute of Physics and Technology, Dolgoprudny, Russia*
[3] *Dipartimento di Fisica dell'Università di Messina, 98166 Messina, and Istituto Nazionale di Fisica Nucleare, Sezione di Catania, 95123 Catania, Italy*

We used the fast digital shape analysis technique and neutron-γ coincidences method [1] to measure the probability of γ-ray emission accompanying spontaneous fission of the ^{252}Cf nucleus in the energy region 10…100 MeV. Experimental setup included two γ-ray BGO-detectors and neutron plastic scintillator detector in 90° and 180° geometry.

The distances between BGO-detectors and the ^{252}Cf source was 10 cm, the distance between plastic scintillator detector and the source was 50 cm. The activity of the ^{252}Cf-source was about $5x10^6$ neutron/s. The time resolution of the γ-n coincidences was about 2 ns.

Preliminary results for the measured probability in 180° geometry between plastic detector and one of the BGO-detectors is presented at Fig.1 for double coincidences. At Fig.2 there is a histogram of triple coincidences between all detectors.

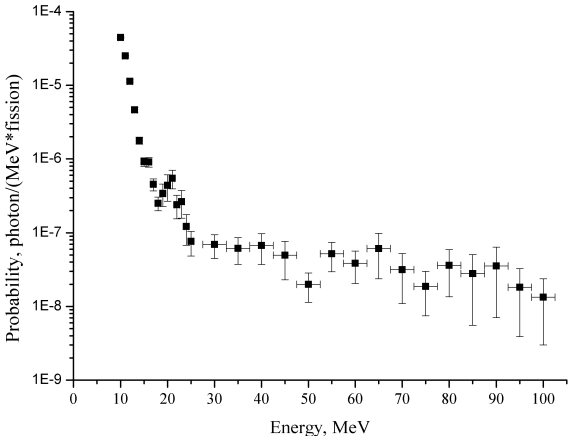

Fig.1. Probability of γ-ray emission accompanying spontaneous fission of ^{252}Cf.

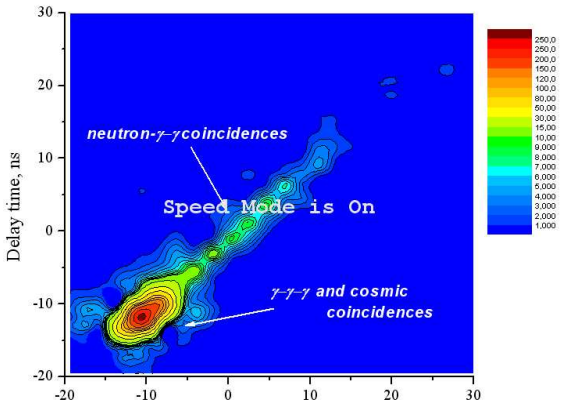

Fig.2. The number of triple coincidences (denoted by color) as a function of delay time between impulses in BGO-detectors and plastic scintillator detector.

[1] N.V. Eremin *et al.*, Int. J. Mod. Phys. E. **19**, 1183 (2010).