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Influence of prompt neutron emission on the distribution of charge as a function of the final mass and kinetic energy of fragments from the reaction ^{233}U(nth, f)

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Concerning thermal neutron induced fission of uranium 233, using a Monte Carlo simulation, we show how prompt neutron emission from fragments distorts the distribution of charge as a function of final mass and kinetic energy compared with the primary distribution. Since fission discovery, the yield of primary charge (*Z*), mass (*A*) and kinetic energy (*E*), has been one of the objectives of measurements of fragments [1]. However, only the yield of final fragment charge (*z*), mass (*m*) and kinetic energy (*e*), after prompt neutron emission, defined as *Y(z,m,e)*, is accessible in low energy fission [1, 2]. In our Monte Carlo simulation, for each *m*, we calculate, the average of charge as a function of *e*. As input for the simulation, we assume that: i) the prompt neutron number (*n*) decreases linearly with kinetic energy (*E*), it's equal to the neutron multiplicity (ν) when E is equal to the corresponding average, and it falls to zero at the corresponding maximal value (*E*_max) [3] and ii) the average of primary fragment charge is proportional to the primary fragment mass (*A*) and to the charge/mass ratio of fissioning nucleus (92/234). As output of the simulation, we obtain the distribution of final fragment mass (*m=A-n*), kinetic energy (*e=E* (1- *n/A*)) and charge (*z=Z*). As a result, for a fixed final mass in the region *m* = 80 - 100, prompt neutron emission produces a negative slope in the curve of average charge as a funtion of *e*. This result is in agreement with experimental data obtained by Quade et al [1]. Surprisingly, in the region of heavy fragment, contrary to what happens in the mass region *m* = 80 - 100, the curve of average charge as a funtion of *e* has a positive slope. In order to compare this results in that heavy mass region, data from experiments with new technologies is expected [2].

1. U. Quade et al., Nucl. Phys. A 487 (1988) 1-36
2. P. Grabitz et al., Journal of Low Temperature Physics 184 (2016) 944–951
3. M. Montoyaa, J. Rojasa and I. Lobato, Rev. mex. fis. 54 (2008) 440–445

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