

INTRANUCLEAR CASCADES EFFECTS ON THE COMPOSITION AND ENERGY OF (p,x)-NUCLEAR REACTION PRODUCTS

Wednesday, October 14, 2020 6:10 PM (5 minutes)

INTRANUCLEAR CASCADES EFFECTS ON THE COMPOSITION AND ENERGY OF (p,x)-NUCLEAR REACTION PRODUCTS

Novikov N.V., Chechenin N.G., Chuvilskaya T.V.,
Chumanov V. Ya., Shirokova A.A.
Skobeltsyn Institute of Nuclear Physics Lomonosov Moscow State University,
Moscow, Russian Federation
E-mail: nvnovikov65@mail.ru

The relaxation of the nucleus in the pre-equilibrium phase, excited in reaction with protons of high energy, proceeds predominantly via an emission of several nucleons and α -particles. In addition to light nuclei with $Z \leq 2$ and neutrons at the proton energies $E_0 > 140$ MeV, γ quanta, leptons, and mesons there can also be emitted. The charge, mass, and energy distributions of heavy fragments formed in the collisions of protons with silicon and iron nucleus are studied using TALYS-1.9 [1], GEANT4 [2] and FLUKA [3] programs. The divergence between TALYS and GEANT4, FLUKA results above 300 MeV is analyzed and ascribed to the contribution of intranuclear cascades developed in the p+Si and p+Fe nuclear systems which is taken into account in GEANT4 and FLUKA, but not in TALYS. From the comparison, we deduce the essential role of intranuclear cascades in the compound p+Si and p+Fe nuclear systems at the pre-equilibrium phase of reaction at high colliding energies.

1. A. J. Koning, D. Rochman // Nucl. Data Sheets. 2012. V.113. P. 2841. <http://www.talys.eu>
2. J. Allison, K. Amako, J. Apostolakis et al. // NIM A. 2016. V.835. P.186. geant4.web.cern.ch
3. T.T. Böhlen, F.Cerutti, M.P.W. Chin, et al. // Nuclear Data Sheets, 2014, V.120, P.211. www.fluka.org/fluka.php

Primary authors: Mr NOVIKOV, Nikolay (Skobeltsyn Institute of Nuclear Physics Lomonosov Moscow State University, Moscow, Russian Federation); Mr CHECHENIN, Nikolay (Skobeltsyn Institute of Nuclear Physics Lomonosov Moscow State University, Moscow, Russian Federation); Ms CHUVILSKAYA, Tatiana (Skobeltsyn Institute of Nuclear Physics Lomonosov Moscow State University, Moscow, Russian Federation); Mr CHUMANOV, Vladimir (Skobeltsyn Institute of Nuclear Physics Lomonosov Moscow State University, Moscow, Russian Federation); Ms SHIROKOVA, Alla (Skobeltsyn Institute of Nuclear Physics Lomonosov Moscow State University, Moscow, Russian Federation)

Presenter: Mr NOVIKOV, Nikolay (Skobeltsyn Institute of Nuclear Physics Lomonosov Moscow State University, Moscow, Russian Federation)

Session Classification: Poster session 2 (part 2)

Track Classification: Section 2. Experimental and theoretical studies of nuclear reactions.