Simulation of the influence of borated polyethelene on neutron and photon energy spectra emitted in the process of spontaneous fission of Cf-252

Borated (5%) polyethelene material set in GEANT4 (8"x4"x2" brick):

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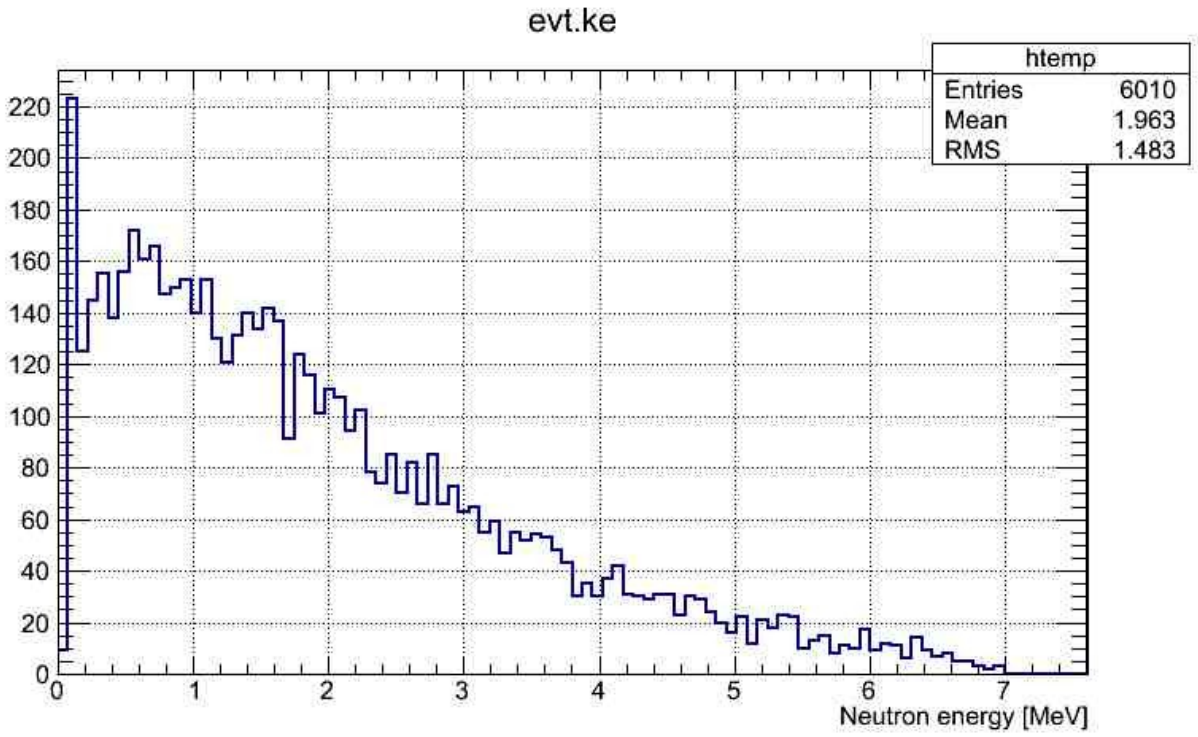
//Borated (5%) Polyethelene
G4Isotope* iso_B10 = new G4Isotope("Boron10", /*Z=*/5,/*A=*/10 , /*Isotope
mass=*/10.0129370*g/mole);
G4Isotope* iso_B11 = new G4Isotope("Boron11", /*Z=*/5,/*A=*/11 , /*Isotope
mass=*/11.0093054*g/mole);

 G4Element* Boron= new G4Element("Boron","B", /*number of components*/2);
 Boron -> AddIsotope(iso_B10, /*Abundance*/19.6*perCent);
 Boron -> AddIsotope(iso_B11, /*Abundance*/80.4*perCent);

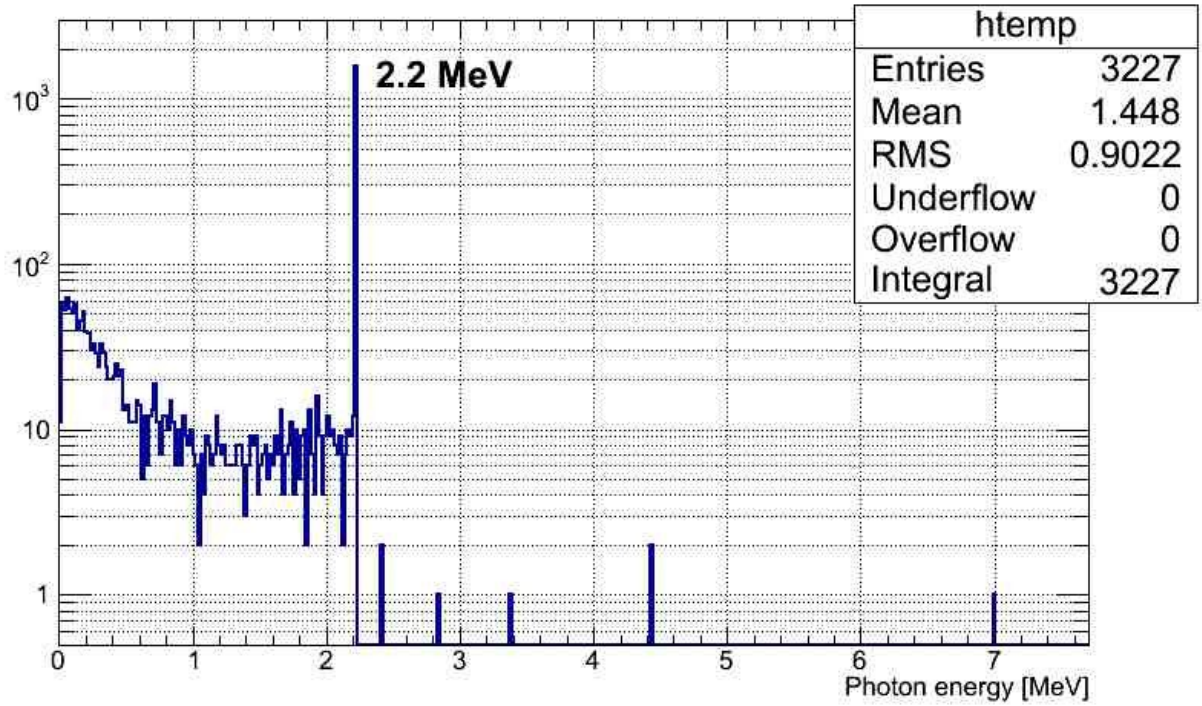
G4Material* BoratedPoly =
  new G4Material("BoratedPoly", density= 1.08*g/cm3, 3);
  BoratedPoly->AddElement(elH, 83.1*perCent);
  BoratedPoly->AddElement(elC, 11.9*perCent);
  BoratedPoly->AddElement(Boron, 5*perCent);
```

The incident particles were hitting the brick along 2" side and there was no particle divergrnce (“pencil” beam). The spectra obtained under the neutron irradiation of the brick are presented below and the emision is in 4pi.

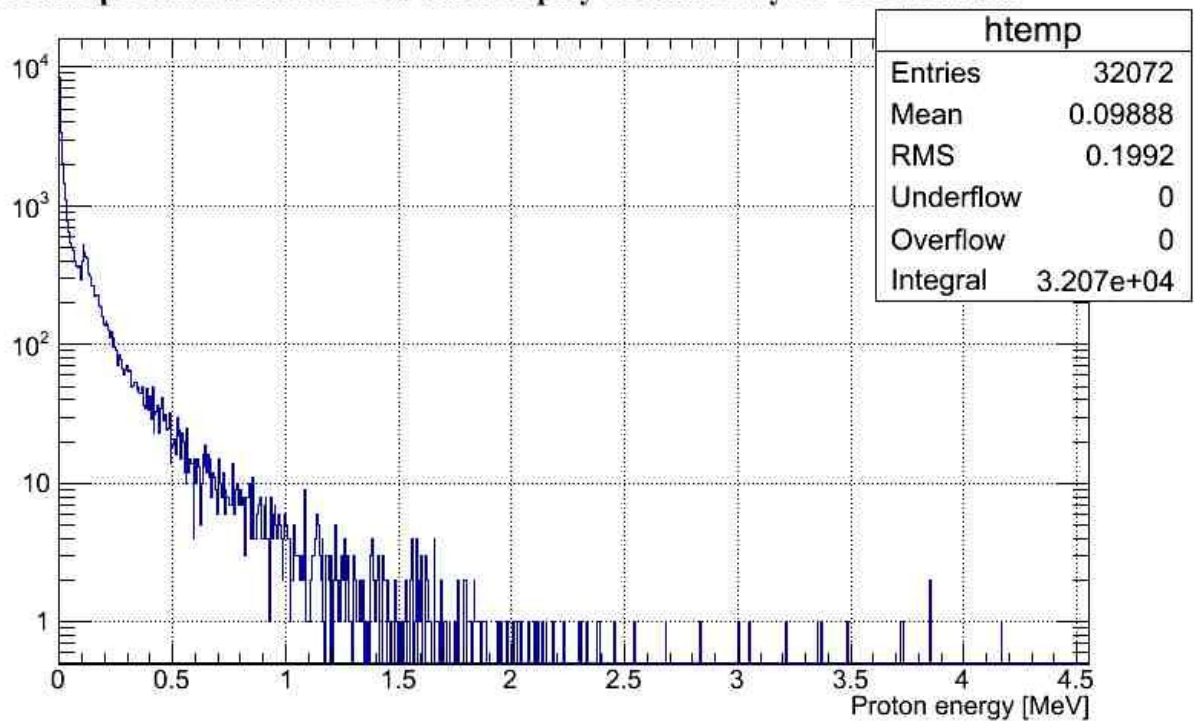


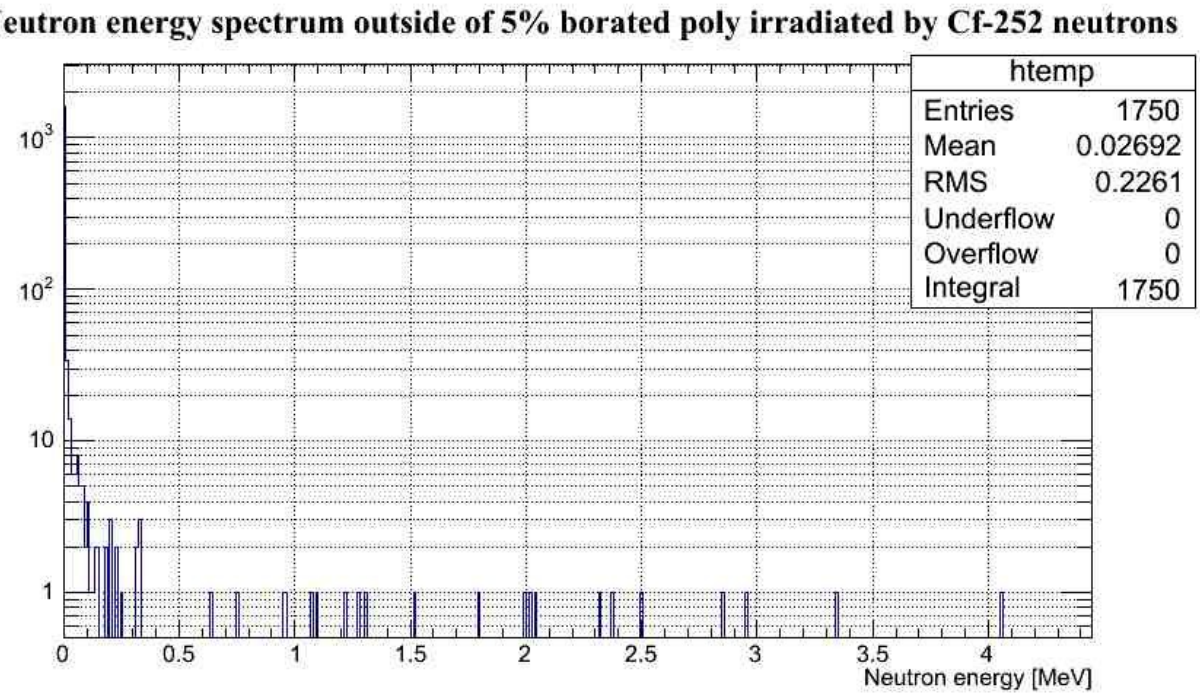
Energy spectrum of incident neutrons from Cf-252.

Photon spectrum outside of 5% borated poly irradiated by Cf-252 neutrons

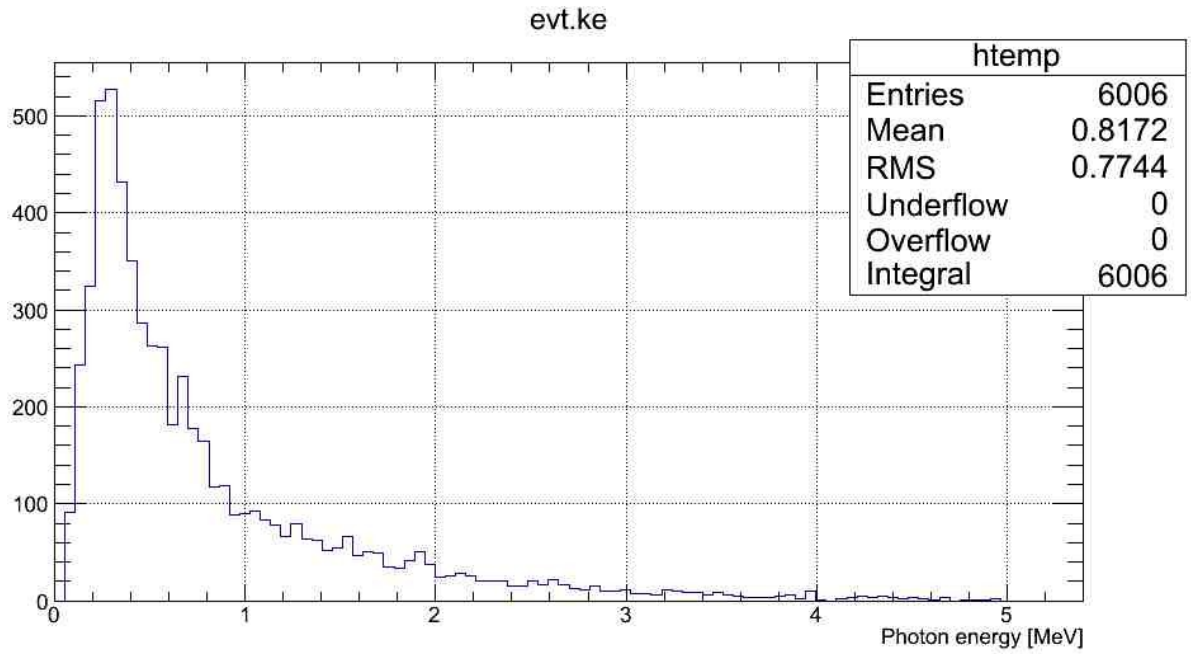


Proton spectrum outside of 5% borated poly irradiated by Cf-252 neutrons





The spectra obtained under the photon irradiation of the brick are presented below and the emision is in 4pi.



Energy spectrum of incident photons from Cf-252.

Photon spectrum outside of 5% borated poly irradiated by Cf-252 photons