

## Production of the Gamma-ray via narrow resonance reaction and its applications

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High energy  $\gamma$ -ray can be used for nuclear waste transmutation, because of the giant resonance. The generation of high energy  $\gamma$ -ray mainly include bremsstrahlung, laser Compton scatter and resonance reaction. The thick target yield of the  $9.17\text{MeV}$   $\gamma$ -ray from the resonance at  $1.75\text{MeV}$  in the  $^{13}\text{C}(p, \gamma)^{14}\text{N}$  was measured by use of HPGe detector. The absolutely efficiency of the detector was calibrated by the GEANT4 simulation and the known radioactive activities of  $^{56}\text{Co}$  and  $^{152}\text{Eu}$ . The energy and angular distribution of the  $9.17\text{MeV}$   $\gamma$ -ray are determined. Meanwhile, the photo neutron cross section at the energy of  $9.17\text{MeV}$  for  $^{197}\text{Au}(\gamma, n)$  has been determined.

**Primary author:** Dr DANG, YONGLE (China Institute of Atomic Energy, CIAE)

**Presenter:** Dr DANG, YONGLE (China Institute of Atomic Energy, CIAE)

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