

design, optimization and construction of triplet RETGEM nuclear detector using artificial intelligent systems

Monday, 2 October 2017 15:10 (170)

Today, Gas Electron Multipliers (GEMs) like detectors are widely used in a variety of applications from medical and industrial applications to high precision experiments in Large Hadron Collider (LHC). According to this wide range of usage of GEM like detectors and their developments, improving the robustness and gain level of them attract a lot of interests. The aim of this paper is to design and to manufacture the first triplet RETGEM nuclear detector by using artificial intelligent systems. Adding the layers of the detector, from single RETGEM to triplet one and choosing the proper range of parameters reduces the electrical discharge probability and so we would achieve the higher gain levels. We use the Printed Circuit Boards (PCB) as the basic part of RETGEM layers and then cover them using a thin layer of graphite as a resistive conductor. In the next step, the container bulk and electrical parts have been manufactured. The electrical part of the detector is a Charge Sensitive Amplifier (CSA), which it amplifies the results and filters the noises. The measurements by the manufactured RETGEM nuclear detectors shows that the triplet RETGEM filled by mixture gasses of Ar-CO₂ with 80-20 percentage can achieve to the gain levels up to 10 million while the gain level of a single RETGEM in the same condition rises up to 0.1 million. We also show that the probability of electrical discharge will be reduced in gas mixtures pressures in the range of 1.5 to 2 Bar.

Primary author(s) : Dr. FARHADI, mansour (young researchers and elite club, bandar abbas branch, islamic azad university)

Presenter(s) : Dr. FARHADI, mansour (young researchers and elite club, bandar abbas branch, islamic azad university)

Session Classification : Poster session and coffee&reception