

Abstract

Resistive plate Chamber (RPC) is a gaseous detector consists of two parallel plates with bulk resistivity of 10^{10} - 10^{16} Ohm-cm, separated by a gas gap of a few millimeters. An applying high voltage to the electrodes covering the outer surfaces generates a strong electric field across the gas volume. Crossing charged particles create clusters of electrons and positive ions inside the gas. The electrons avalanche as they move towards the anode and this movement induces a measurable signal on the readout strips, which can be amplified and measured by proper readout electronics. In this talk, we focus on the detector physics of RPCs, with providing a detailed simulation of avalanche development in RPC. Through this simulation, effect of ambient temperature on the performance of a resistive plate chamber is studied in the framework of a Monte Carlo procedure. It is shown that the temperature dependence of avalanche characteristics depends on the gas type and increasing temperature shifts efficiency plateau of an RPC to lower applied voltages. The shift can be removed by scaling high voltage with temperature, which is in a very good agreement with available experimental data.