

Effect of variations in the gas mixture compositions on the timing and charge of glass RPC

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The India-based Neutrino Observatory (INO) is a mega science project aimed at building a large underground laboratory to study the atmospheric neutrinos. INO will host a 50 kton magnetized iron calorimeter detector (ICAL) in which Resistive Plate Chambers (RPCs) will be the active detector elements. In ICAL, 28,800 glass RPCs of $2\text{ m} \times 2\text{ m}$ size will be operated in the avalanche mode. The performance of RPCs will be changed by a small variation in the gas mixture compositions. Study of the charge distribution of the RPCs at different gas compositions is necessary to optimize the gas mixture.

An RPC made with glass samples of dimension $30\text{ cm} \times 30\text{ cm}$ was operated in avalanche mode with a gas mixture of $C_2H_2F_4/C_4H_{10}/SF_6$. We have studied the performance of these RPCs at the same ambient conditions. The percentages of the C_4H_{10} or SF_6 are varied and its effect on the RPC were studied. The study of the charge distribution and time resolution of the RPC signals at different gas compositions will be presented in the conference.

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