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The causes and the effects of O₂ contamination on the performance of a Micromegas detector

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Being state-of-the-art, the Micro-Pattern Gaseous Detectors (MPGD) are widely accepted in several particle physics experiments like ATLAS, COMPASS, CMS, ALICE, CBM, EIC, ILC, etc. Micromegas is a type of MPGD which is famous for its simple single-stage amplification, high and stable gain, low ion feedback, and excellent spatial and temporal resolutions. It is a reliable candidate in many of the aforementioned experiments. The chance of O₂ contamination in a gaseous detector gas is not negligible as the abundance of O₂ in the air is nearly 21%. Being an electronegative gas, O₂ can capture electrons inside a gaseous detector. Therefore, while running a gaseous detector of large size, O₂ contamination, even at a very low concentration, may degrade the detector performance. We have systematically studied one of the possible reasons for O₂ contamination of the gas inside a detector. Then by infusing O₂ inside a resistive Micromegas chamber in a controlled and precise way, we have studied its effects on the fluctuation of primary electrons and on the instability of gas-gain of the detector. Both aspects of our study have been supported by numerical investigations.

Is this abstract from experiment?

No

Name of experiment and experimental site

N/A

Is the speaker for that presentation defined?

Yes

Details

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Internet talk

No

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