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Gas Quality Monitor for gaseous detectors

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Reliable operation of gaseous coordinate detectors in modern High Energy Physics experiments requires precise and stable composition of the working gas mixture. Independent monitoring of the gas quality is vital for many detector systems.

We propose independent gas quality monitoring system based on a straw tube module equipped with a configurable high voltage supply, readout electronics and RaspberryPi-based lightweight Data Acquisition System. The module can be connected to a supply or return lines of the monitored gas system. Straw response to a ^{55}Fe X-ray source is amplified, digitized and recorded. The peak position of the signal amplitude spectra is proportional to the straw gas gain which in turn depends on the gas quality, pressure and temperature.

Careful calibration of pressure and temperature dependence allows to obtain high sensitivity to the changes of the gas composition. The results achieved with $\text{Ar}/\text{CO}_2/\text{CF}_4$ gas mixtures are presented.

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