

First users experience with a recently developed "standardized ionization gauge"

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The newly developed ionization vacuum gauge is the result of successful collaboration between leading European National Metrology Institutes, academia, the European Council for Nuclear Research CERN, and vacuum gauge manufacturers. The development was supported by the EURAMET EMPIR research program in the project 16NRM05 - "Ion Gauge".

The new ionization vacuum gauge represents a significant advancement towards more accurate high vacuum measurements. The primary goal was to improve the temporal stability of the gauge sensitivity, which is one of the most important properties of the reference measurement standards. An additional goal were stable relative sensitivity factors for different gases, which is important for calibrations of partial pressure analyzers. Two industry partners in the 16NRM05 project developed prototype gauges that underwent extensive testing at participating national metrology institutes. This talk will present our first experience of working with a new gauge.

Despite careful design to collect primary electrons in a Faraday cup to protect the ion collector from X-rays, secondary electrons and desorbed ions, current prototype gauges have a relatively high residual signal of the order of 2×10^{-7} Pa in nitrogen gas. This residual signal is subtracted when a new gauge is used to calibrate the sensitivity of other ionization gauges or partial pressure analyzers, so it is not interfering. However, when the gauge is used to directly measure the gas pressure, the residual signal determines the lower measuring limit. In the talk the sources of the residual signal and its stability will be analyzed.