

## **Development of a new kind of ionisation vacuum gauge**

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A novel ionisation vacuum gauge was developed with the aim to provide a measuring instrument of high metrological quality for high vacuum. The new gauge shall serve as reference standard for calibration of other vacuum gauges and quadrupole mass spectrometers and as transfer standard for comparison between fundamental vacuum standards in the range from  $10^{-6}$  Pa to  $10^{-2}$  Pa. The gauge was developed after a careful analysis of existing ionisation vacuum gauges and a comprehensive literature review.

In the new design, the electrons take a straight path from the emitting cathode through the ionisation space into a Faraday cup. Compared to existing ionisation vacuum gauges, this has the advantage that the electron path length is well defined. It is independent of the point and angle of emission and is not affected by space charge around the collector. In addition, the electrons do not hit the anode where they can be reflected, generate secondary electrons or cause desorption of neutrals or ions. The design is mechanically rigid (no grids or thin wires used) so that transport stability is ensured.

The talk will outline the new design, describe its development and the main metrological features of gauges manufactured according to the new design.

The success of the development makes the gauge suitable to be standardised on the ISO level, but also attractive for industrial applications, because a gauge exchange does not require calibration or re-adjustment of a vacuum process.