PHYSICAL METROLOGY - ELECTRICITY

The objective of the BIPM electricity laboratories is to ensure consistent measurements in the field of electricity within the Member States. This is achieved by organizing **comparisons of highest-level electrical standards** and by providing calibrations to those institutes which do not possess such standards.

IMPACT

The BIPM provides comparison and calibration services to NMIs for voltage, resistance and capacitance. These services have an impact by allowing NMIs to demonstrate equivalence of their primary standards and by providing traceability to the SI for many smaller NMIs. The accurate and traceable measurement of electrical quantities plays a crucial role in enabling the reliable application of electrical technologies.

KEY ACHIEVEMENTS SINCE 2022

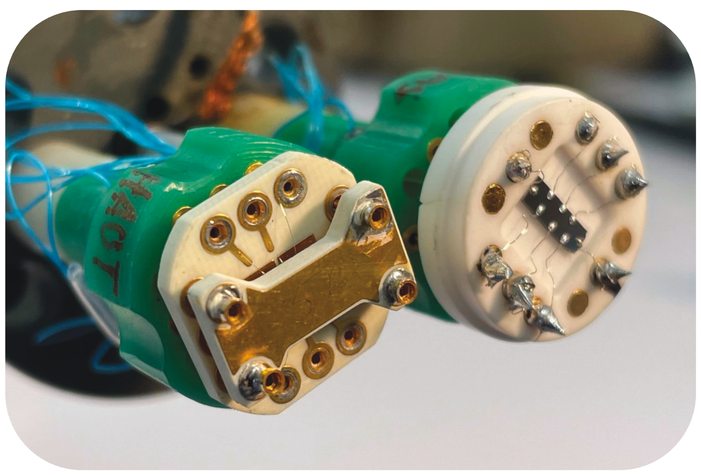
On-site comparison of quantum voltage standards

- The BIPM has **extended the comparison programme** of on-site comparisons of **quantum voltage standards** from DC voltages to sinusoidal voltages up to 1kHz, relevant for measurements of electric power.
- These comparisons reinforce confidence that AC voltage measurements realized in different countries are consistent and anchored to the same quantum defined reference.



Credit: BIPM

On-site comparison of quantum resistance standards

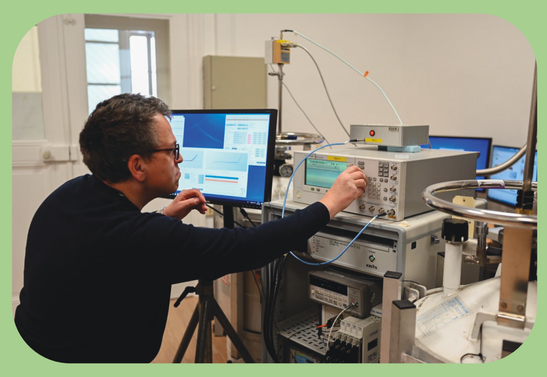


Credit: BIPM

- The programme of on-site comparisons of quantum resistance standards continued, including **new graphene standards** as a more practical primary standard.
- Graphene-based QHR devices were used alongside traditional gallium arsenide devices and the results demonstrated equivalent performance while operating under less demanding experimental conditions.

Calibrations of electrical standards for Member States

During 2023-2026, the BIPM electricity laboratories provided more than **300 calibration certificates** to **40 NMIs** in its Member States.



Credit: BIPM