Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Graphene-based quantum Hall resistance standards grown by chemical vapor deposition on silicon carbide REBECA RIBEIRO-PALAU, FABIEN LAFONT, Laboratoire National de Metrologie et d'Essais, DIMITRIS KAZAZIS, Laboratoire de Photonique et de Nanostructures, ADRIEN MICHON, Centre de Recherche sur l'Hétéroépitaxie et ses Applications, OLIVIER COUTURAUD, CHRISTOPHE CONSEJO, BENOIT JOUAULT, Laboratoire Charles Coulomb, WILFRID POIRIER, FELICIEN SCHOPFER, Laboratoire National de Metrologie et d'Essais — Replace GaAs-based quantum Hall resistance standards (GaAs-QHRS) by a more convenient one, based on graphene (Gr-QHRS), is an ongoing goal in metrology. The new Gr-QHRS are expected to work in less demanding experimental conditions than GaAs ones. It will open the way to a broad dissemination of quantum standards, potentially towards industrial end-users, and it will support the implementation of a new International System of Units based on fixed fundamental constants. Here, we present accurate quantum Hall resistance measurements in large graphene Hall bars, grown by the hybrid scalable technique of propane/hydrogen chemical vapor deposition (CVD) on silicon carbide (SiC). This new Gr-QHRS shows a relative accuracy of 1×10^{-9} of the Hall resistance under the lowest magnetic field ever achieved in graphene. These experimental conditions surpass those of the most wildely used GaAs-QHRS. These results confirm the promises of graphene for resistance metrology applications and emphasizes the quality of the graphene produced by the CVD on SiC for applications as demanding as the resistance metrology.

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Date submitted: 14 Nov 2014 Electronic form version 1.4