

Nobel Prizes in Physics, Advanced Materials, and the New Kilogramm

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One of the new materials for advanced technologies is graphene, the ultimate two-dimensional system with very special properties. The Nobel Prize in Physics 2010 for the experimental realization of this unique material was awarded exactly 25 years after the Nobel Prize in Physics 1985 for the discovery of the quantum Hall effect (QHE) and surprisingly, these two Nobel Prizes have something in common which is important for the expected new definition of the mass unit kilogram.

If the 24th General Conference on Weights and Measures in October 2011 accepts the recommendation to relate the International System of Units (SI system) to fundamental constants, the kilogram will be realized by a fixed number for the Planck constant h . For this realization either the special properties of a two-dimensional electron system (graphene, GaAs/AlGaAs heterostructures) or the properties of an ideal silicon single crystal will be used.

The presentation will summarize the physics and material science aspects connected with the expected replacement of the kilogram artifact in Paris and the introduction of a new SI system.