S2A3

Public Lecture Series

The SI Redefined: Losing the last artefact and counting atoms

Speaker: **Dr Wynand Louw**
Director Research, International and Infrastructure Development, National Metrology Institute of South Africa (NMISA)
President of the Consultative Committee for Ionising Radiation, International Bureau of Weights and Measures.

On: Wednesday, 10 August 2016

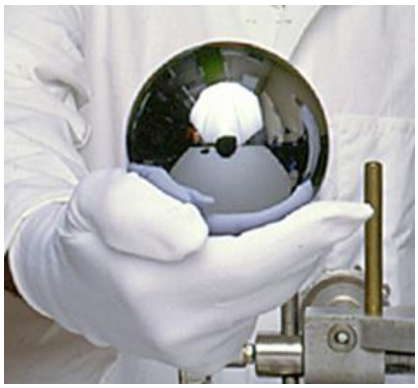
At: 17h15

Venue: Sci-Enza, Main Campus, University of Pretoria (Use the Prospect Street entrance. See http://s2a3.org.za/directions.php for directions and a map.)

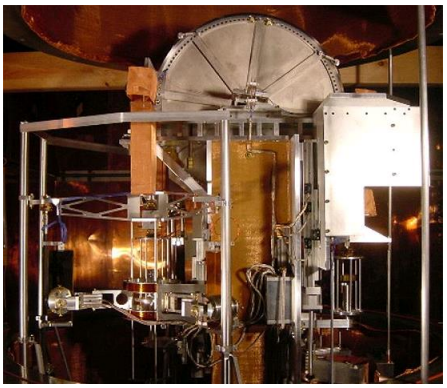
The International System of Units is undergoing a redefinition where fundamental constants are to serve as the defining reference values for all seven base units and for all derived units in the future. In 2018, the kilogram, ampere, mole and kelvin will be redefined with the others to follow. The most profound effect is that the last artefact for a base unit, the International Prototype of the Kilogram (IPK), will cease to be the standard for mass. This opens exciting new research and application opportunities for metrologists: realising the kilogram with a Watt (Kibble) balance, counting atoms for an alternative definition of the kilogram and for the definition of the mole, single-electron pumps for the ampere, dielectric constant gas thermometry for the kelvin.

Dr Louw will give an overview of these changes as well as planned and current research internationally and in South Africa for the redefinition, the realisation of the units and its implementation. These include the Watt balance, Avogadro, Quantum Ampere and Quantum Hall projects at the NMISA and how the traceability chain will be shortened for Africa.

Count what is countable, measure what is measurable, and what is not measurable, make measurable - Galileo Galilei.



A 1-kg single-crystal silicon sphere for the Avogadro Project, used for measuring the Avogadro constant to a relative uncertainty of 2×10^{-8} or less. (CC BY-SA 30.0 CSIRO)



The NIST Watt balance; the vacuum chamber dome, which lowers over the entire apparatus, is visible at top. (CC BY-SA 3.0 Richard Steiner)