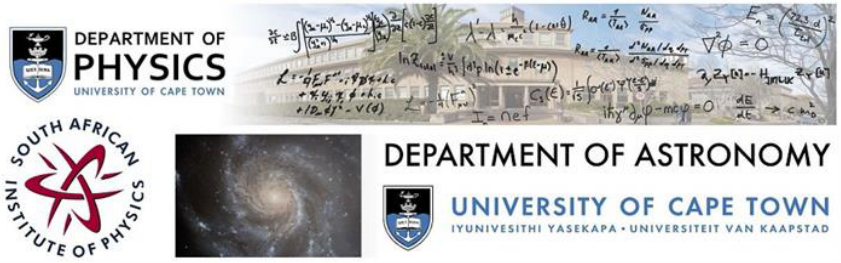

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Accurate Volume Measurements of Irregular Objects at NMISA

Wednesday, 6 July 2016 15:00 (20 minutes)

Abstract content
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Accurate volume determination of irregular objects can be complex because there are no standard formulas to be applied. One technique to apply is the water displacement method which is not very accurate. The other is using Archimedes' principle where the buoyant force exerted by a fluid on the submerged object is equated to the weight of the object. By measuring the mass of the object and knowing the fluid density, the volume of the object can be determined. At NMISA, hydrostatic weighing which is based on Archimedes' principle is applied in the FC-40 fluid to determine the volume of the mass pieces from 1 g to 1 kg. Volumes of the OIML-shaped stainless steel and spherical weights have been measured using the automated volume comparator (VC1005). The results for volumes of some of the mass pieces such as the OIML-shaped 50 g weights were measured to within an accuracy of 99.996% with measurement uncertainties of ± 0.0005 cm3. These measurements lead to the determination and confirmation of densities of the materials which is critical for high accuracy mass measurements. This paper will present results found for various mass pieces which were used to determine densities of their material.

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