

Recent Development in the Differential Measurement of Subfemtonewton Forces

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An experimental technique has been recently developed to measure forces differentially between two samples with similar but not identical compositions. The implementation of this approach, with the important reduction in common background effects will be presented. . An Au-covered rotating sample composed of different sectors interacts with a metal-coated sphere. Emphasis is paid to the discussion of remnant systematic effects and their impact on the measurements. It is observed that a residual impulsive motion of the axis of rotation of the apparatus remain, contributing at the 0.1 fN level. Apparently random oscillations of the axis of rotation also increase the minimum detectable force by a factor near two. In this presentation details on the differential measurements performed on the engineered samples will be presented. These measurements allow to have a subfemtonewton sensitivity. A discussion of the limitation, some systematic errors and possible improvements will be given.