Poster Session #A
Laboratory tests of gravitation

A05

Observing quantum gravity effects with twin, co-located, tabletop 3D interferometers

William Griffiths (Cardiff University)

Theories of quantum gravity suggest space-time exhibits quantum fluctuations. The holographic principle further implies that these fluctuations are correlated in overlapping volumes of space-time. If observed, the correlated fluctuations would provide a hint to how gravity and quantum theories may be unified. Twin co-located interferometers would allow testing these theoretical models through their cross-spectrum to detect common-mode fluctuations of space-time. Cardiff University's Gravity Exploration Institute is building co-located tabletop interferometers with sufficient sensitivity to validate or exclude some theories of quantum space-time. The tabletop interferometers will not only be used for quantum gravity tests but will also be sensitive to MHz gravitational waves and dark matter candidates. To achieve unprecedented sensitivity, we will make use of highly squeezed vacuum states and a 200MHz bandwidth output mode cleaner.