

SCHOOL OF PHYSICS

UNIVERSITY OF NEW SOUTH WALES



COLLOQUIUM

4-5 p.m., Tuesday, 23 June 2009

School of Physics Common Room

Room 64, Old Main Building

Professor Michael Tobar

ARC Professorial Fellow, School of Physics, UWA

“Cooling Acoustic Oscillators with Electromagnetic Parametric Transducers and Prospects of Measuring Below the Standard Quantum Limit of Displacement”

This work describes high-Q parametric transducers that have been developed at the University of Western Australia for a variety of ultra-precise measurements since the 1990s. These systems rely on very low-noise pump oscillators and readout systems at microwave frequencies and produced the lowest noise resonant-bar gravitational wave detector of the decade. A research program to measure the Standard Quantum Limit (SQL) of displacement of an acoustic oscillator and perform Quantum Non-Demolition (QND) was initiated. Promising results were obtained using re-entrant cavities and Whispering Gallery modes in high-Q sapphire resonators. In the case of the sapphire transducer the first measurement of resolve sideband cooling of an acoustic oscillator was made, which is a necessary requirement for QND measurement. In this talk I will summarize the major achievement of our parametric transducer work and summarize what is necessary to measure the SQL and perform a QND experiment using our technology.

The audience is invited to meet the speaker beforehand at 3.45 p.m. over coffee and biscuits in the Common Room.

Dr. Adam Micolich

Ph.: (02) 9385-6132

e-mail: mico@phys.unsw.edu.au