Area Seminar

Title	Non-linear Nyquist theorem: A conjecture
Date and Time	24/07/2014 16:00:00
Speaker	Navinder Singh PRL
Area	Theoretical Physics
Venue	Room No. 469
Abstract	We conjecture "a non-linear Nyquist theorem" for the first time. Our conjecture is based upon tests of the conjectured relation in specific systems in the thermodynamical limit. Nyquist theorem (that relates fluctuations with admittance) is a cornerstone in non-equilibrium statistical mechanics and is an example of the general class of relations called the fluctuation-dissipation theorem. In linear systems it is proved in its generality in a beautiful piece of work by Callen and Welton (in 1950s) . It states that r.m.s. value of fluctuations (in equilibrium) is proportional to the integral of linear admittance (non-equilibrium). We conjecture--with an explicit quantum mechanical calculation of non-linear admittance and fluctuations--that higher moments of the fluctuations bear a similar relation to {\it non-linear} admittance. Thus one can in principle compute non-linear admittance from the character of fluctuations--a relation that should have great practical applicability, for example, for electronic devices that operate under non-linear response.