Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Inelastic electron and Raman scattering from the collective excitations in quantum wires MANVIR KUSHWAHA, Rice University — The nanofabrication technology has taught us that an m-dimensional confining potential imposed upon an n-dimensional electron gas paves the way to a quasi-(n-m)-dimensional electron gas, with $m \leq n$ and $1 \leq n, m \leq 3$. This is the road to the (semiconducting) quasi-n dimensional electron gas systems we have been happily traversing on now for almost two decades. Achieving quasi-one dimensional electron gas (Q-1DEG) led us to some mixed moments in this journey: while the reduced phase space for the scattering led us believe in the route to the faster electron devices, the proximity to the 1D systems left us in the dilemma of describing it as a Fermi liquid or as a Luttinger liquid. No one had ever suspected the potential of the former, but it took quite a while for some to convince the others on the latter. A *realistic* Q-1DEG system at the low temperatures is best describable as a Fermi liquid rather than as a Luttinger liquid. This has motivated us to employ the Bohm-Pines' full RPA to develop a systematic methodology for the inelastic electron and light scattering from the collective (plasmon) excitations in Q-1DEG [or quantum wires]. We will discuss in detail the results published in AIP Advances **3**, 042103 (2013).

Manvir Kushwaha
Rice University

Date submitted: 05 Nov 2013 Electronic form version 1.4