

CMP Seminar
Michigan State University

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Quantum Circuits and Quantum Faucets

In 1950, quantum field theorist and pioneer Sin-Itiro Tomonaga showed that in *one dimension* an interacting systems of fermions could strangely be modeled by bosonic interactions. But does such 1D quantum state really exist?

I will review the state-of-the-affair in the field of quantum physics in one dimension from the point-of-view of both electronics and fluids. From there, I will discuss at length the phenomenon of Coulomb drag and show data from an engineered quantum circuit formed by two independent wires separated by only 15 nm. I will then discuss how the drag resistance of such circuit appears to be consistent with theories based on the Tomonaga-Luttinger model. Last, if time allows, I will discuss whether similar 1D physics could be observed in a neutral system and I will show flow measurements in a superfluid helium faucet formed by a hole of only 6 nm in diameter.

Monday, March 9, 2015

4:10 PM

BPS 1400

Prof. Alex Levchenko - Host