Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Elementary Electronic Excitations of quantum wells probed by resonant Raman scattering[1] VIRGILIO ANJOS, ALISON ARANTES, MARIA JOSE BELL, Universidade Federal de Juiz de Fora — Electron-electron interactions and quantization may be investigated by means of Raman scattering. Its selection rules on the incoming and outgoing light polarizations allows one to study the intersubband charge- and spin-density excitations. The first gives information about the collective charge-density excitations raised by Coulombian interactions. The latter only collective spin-density excitations due to exchange-correlation effects are present. When the incoming laser light matches an optical gap of the host semiconductor, the electron gas presents also excitations whose energies turn out to be close to the bare electronic transitions of the conduction subbands of the semiconductor. By this reason such excitations are called single-particle excitations. In this work, we study the intersubband excitations of modulation-doped GaAs-AlGaAs quantum-wells where the incoming laser light is resonant with the split-off gap of the GaAs. From the theoretical point of view, we show that the intersubband single-particles excitations are actually *coherent* collective excitations and that physically, a direct correspondence between the resonant Raman scattering and the formation of superconducting state in the BCS theory of normal metals exists.

[1]The authors acknowledge the financial support of FAPEMIG, CAPES and CNPQ.

Virgilio Anjos
Universidade Federal de Juiz de Fora

Date submitted: 15 Nov 2013 Electronic form version 1.4