Contribution ID: **183** Type: **Oral (Student, In Competition) / Orale (Étudiant(e), inscrit à la compétition)**

Two-dimensional conductivity at $LaAlO_3/SrTiO_3$ interfaces

Wednesday 18 June 2014 14:30 (15 minutes)

Experiments have observed a two-dimensional electron gas at the interface of two insulating oxides: strontium titanate ($SrTiO_3$) and lanthanum aluminate ($LaAlO_3$).
These interfaces exhibit metallic, superconducting, and magnetic behaviours, which are strongly affected by impurities.
We introduce a simple model to study the two-dimensional conductivity at $LaAlO_3/SrTiO_3$ interfaces.
Motivated by experiments, we assume that impurities lie at the interface and their density is low.
In our model, we treat the $LaAlO_3$ as an insulator and model the $SrTiO_3$ film.
By solving a set of self-consistent Hartree equations for the charge density, we obtain the band structure of the $SrTiO_3$ film.
We then study the relative contributions made by the occupied bands to the two-dimensional conductivity of the $LaAlO_3/SrTiO_3$ interface.
We find that the fractional conductivity of each band depends on several parameters: the mass anisotropy, the filling, and the impurity potential.

Author: Mrs RASLAN, Amany (Department of Physics and Astronomy, Trent University, Peterborough Ontario, Canada, K9J 7B8)

Co-author: Prof. ATKINSON, W. A. (Department of Physics and Astronomy, Trent University, Peterborough Ontario, Canada, K9J 7B8)

Presenter: Mrs RASLAN, Amany (Department of Physics and Astronomy, Trent University, Peterborough Ontario, Canada, K9J 7B8)

Session Classification: (W2-1) Low Dimensional Systems - DCMMP / Systèmes de basse dimension - DPMCM

Track Classification: Condensed Matter and Materials Physics / Physique de la matière condensée et matériaux (DCMMP-DPMCM)