

Propositions

accompanying the dissertation

Electron Many-Body Effects in Quantum Point Contacts

by

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- 1- Many-body interactions that cause self-consistent localized states for electrons are responsible for the appearance of the 0.7 anomaly and the zero-bias anomaly in quantum point contacts (*chapter 4 of this thesis*).
- 2- The electron many-body physics that causes the 0.7 anomaly in a quantum point contact is a universal phenomenon that appears in a very broad class of device realizations, despite the fact that a particular manifestation is exponentially sensitive to small material and device imperfections (*chapter 3 of this thesis*).
- 3- The 0.7 anomaly and the zero-bias anomaly in quantum point contacts are strongly correlated and therefore result from the same underlying physics (*chapter 4 of this thesis*).
- 4- The annealing mechanism of ohmic contacts strongly depends on the exact way of heating (for example, gas flow in an oven versus radiation in a rapid thermal annealer) and this has been ignored in the scientific literature on this topic (*chapters 6 and 7 of this thesis*).
- 5- The custom in the scientific world of patenting results and publishing in journals with high membership fees implies that science is not a common heritage of mankind.
- 6- The progress in science in the beginning of the 21st century is hampered by tedious visa processes that obstruct the international travel by researchers.
- 7- Progress in science will benefit from a quota for research grants being awarded to the developing countries.
- 8- It has become norm to only look at the final result of PhD research without looking into the trajectory that a particular researcher followed during the PhD period.
- 9- Eliminating injustice is the most fundamental requirement for putting a nation on the fast track of development and prosperity.
- 13- Many scientists are influenced by superstition, while there is clearly no place for superstition in the scientific community (proposition for PhD defense on Friday 13 July 2012).

These propositions are considered defendable and have been approved as such by the supervisor prof. dr. ir. C. H. van der Wal.

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