

## TOWARDS SUPERCONDUCTING NANOTUBE ELECTRONICS.

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Discovery of superconductivity in individual molecules of carbon nanotubes [1] and DNAs[2] opens the door for Superconducting Molecular Nanoelectronics. From nowadays physics point of view only use of superconducting devices can satisfy the requirements of Molecular Nanoelectronics : 1. Ultra high level integration (100-1000 billions devices per centimeter square), 2. Ultra small energy dissipation (100 picoWatt per device), 3. Ultra high operation speed (about 1 picosecond switching time).

In this report we present the following results: 1. Single ion lithography (superconducting properties of a carbon nanotube before and after modification by single 30kV Ga ions), 2. Suppression of superconductivity in a carbon nanotube by ferromagnet electrodes (transport properties of Superconductor – Ferromagnet –

Nanotube – Ferromagnet – Superconductor junctions), 3. Comparison of Future Superconducting Molecular Electronics based on carbon nanotubes and DNAs, 4.Comparison of the experimental results with the theory [3] explaining non BCS behavior of carbon nanotubes. 5. Strong suppression of shot noise in carbon nanotubes.

### *References*

1. A.Yu.Kasumov et al, Science 284, 1508 (1999)
2. A.Yu.Kasumov et al, Science 291, 280 (2001)
3. J.Gonzales cond-mat/0104071, 4 Apr.2001