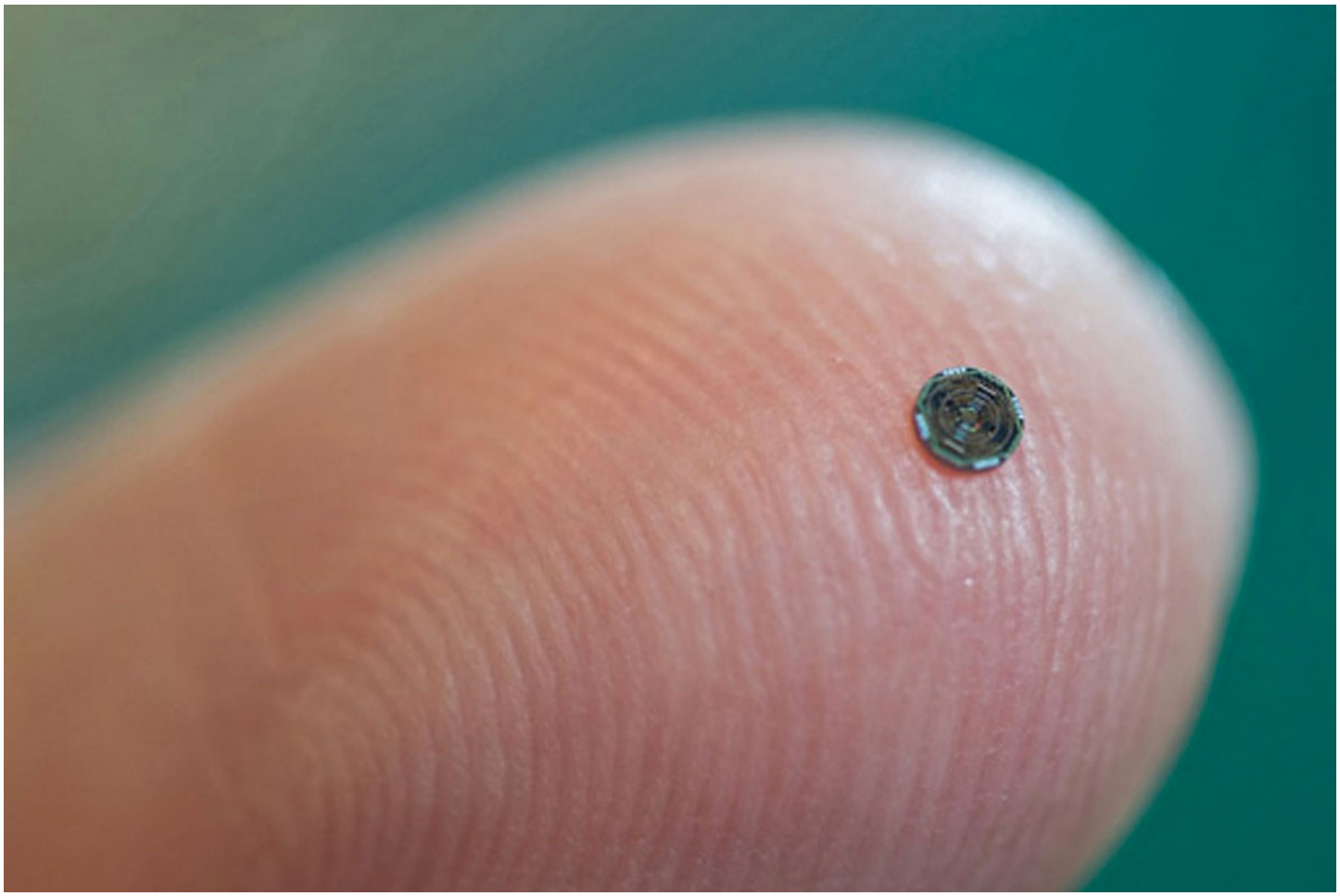
RT Quantum phenomena in microelectromechanical and atom systems



Studies hold within the RT Quantum phenomena in microelectromechanical and atom systems will form the basis of the development of high rate multiplexers used in optical communication systems;

The scientists will develop the theory and the design of equipments of the size not more than one micron.

In future they can be used as a microminiature sensitive sensor painlessly implanted in living organisms.

Group description:

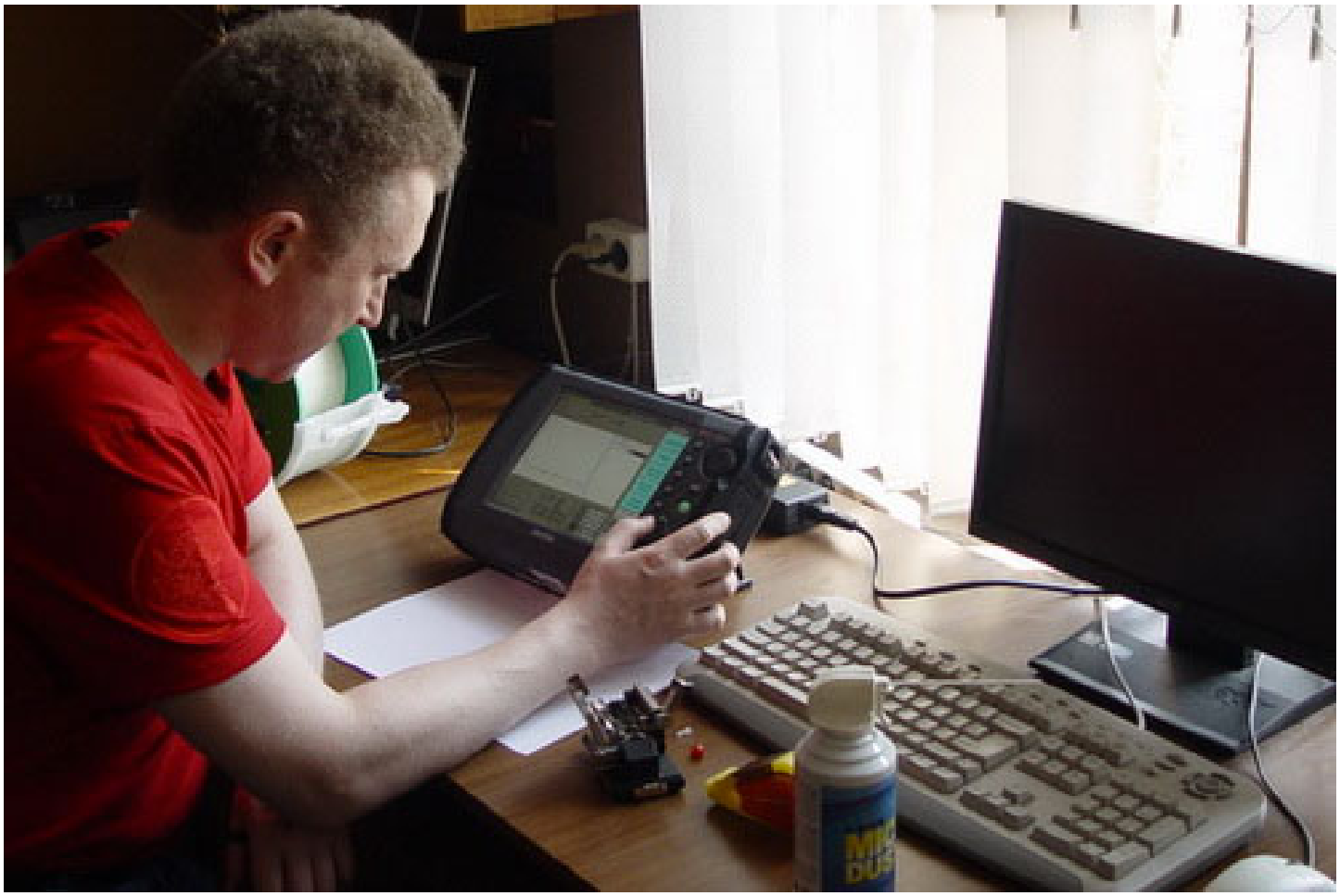
Studies hold within the RT Quantum phenomena in microelectromechanical and atom systems will form the basis of the development of high rate multiplexers used in optical communication systems; highly-accurate quantum frequency standards necessary for the improvement of national GLONASS; microminiature sensitive sensors which can be painlessly implanted in living organisms and allow running large-scale organism diagnostics; equipment for constructing sensitive antenna systems for the sake of national hydroacustics.

RT tasks:

1. When performing scientific work a fundamental theory of the operation of nano-and microelectromechanical systems in respect of Casimir and Van der Waals' forces will be develop. It is planned to create and theoretically ground the innovative methodology allowing the conduction of detailed studies of the equipment work the characteristic dimension of which is fractions of one micron.
2. The interaction of alkali atoms with multifrequency laser emission on condition of resonant coherent-trapping state population in order to design small-dimensioned quantum frequency will be studied. The conditions on which the stability of small-dimensioned quantum frequency in gas cells will have its maximum will be defined.
3. On the basis of the innovative theory the first samples of fundamentally new equipment using the principles of quantum nanomechanics, such as nonlinear oscillators, nano-sized Fabry-Perot interferometers, nanomechanical frequency standards and gyroscopes, nano-sized actuators, etc. will be developed, designed and studied. Innovative experimental installations will be made

which allow to study the operation of nanomechanical devices.

4. It is planned to find new approaches to control optical features of atom and solid state systems on conditions of the resonance of electromagnetic-induced transparency. In particular, the scientists are supposed to introduce the possibility of control photon zones with the help of optical methods.



Eventual buyers:

Public JSC Research Institute “ATOLL”
Public JSC “Group of Companies Electropribor”
Public JSC “RIRV”
Department of Education and Science of the Russian Federation
Federal Space agency of the Russian Federation

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