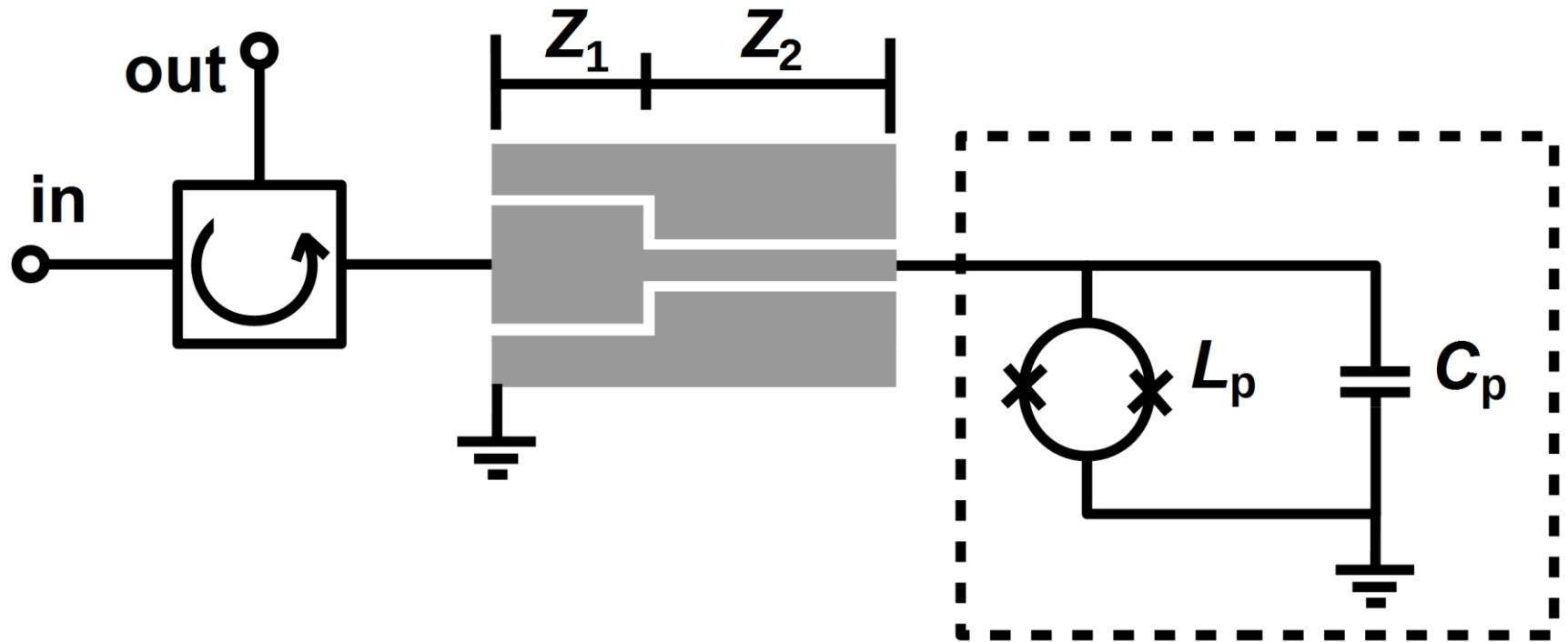


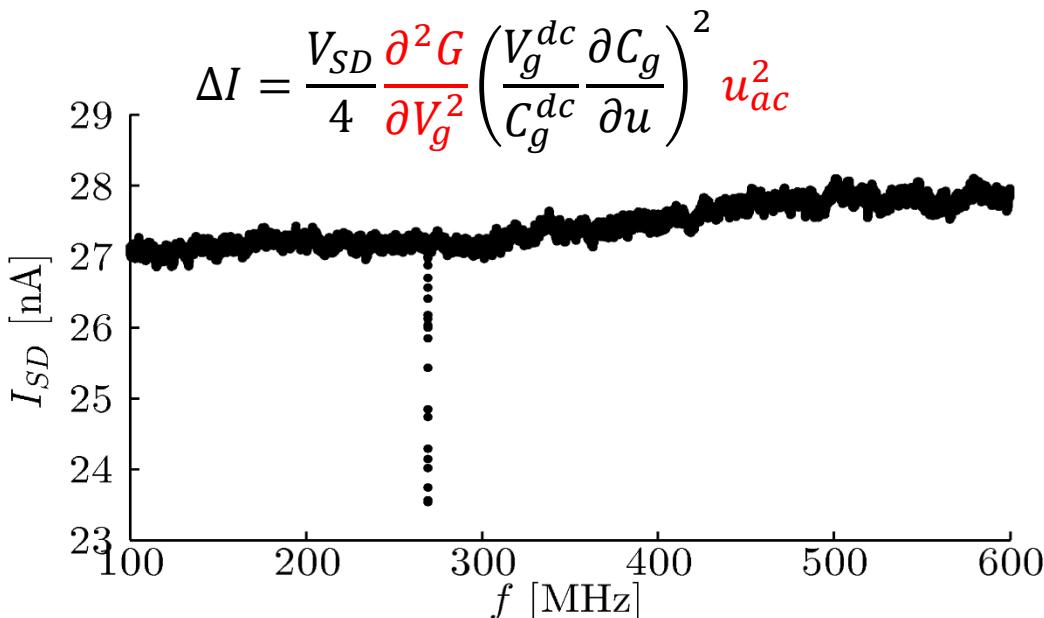
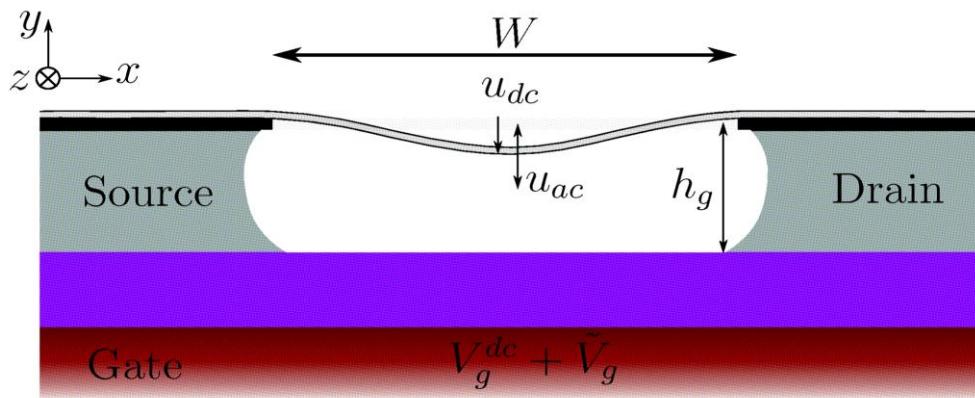
Wide-band parametric amplifier



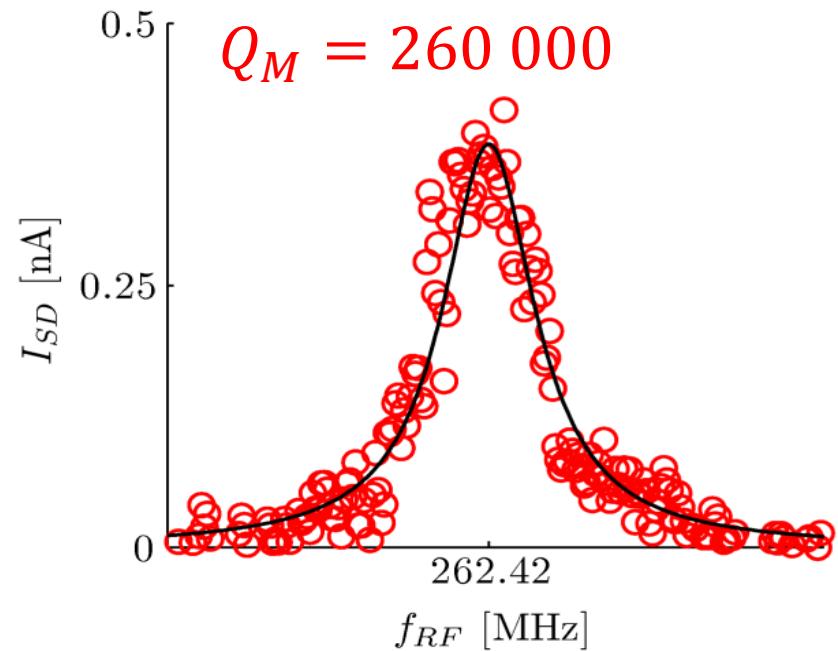
- Task: to test and characterize the amplifier
- The SQUID structure in the dashed box is provided by VTT

Suspended carbon nanotube as a detector

- ▶ Conductance depends on $Q(V_g, u)$



$$\Delta I = \frac{V_{SD}}{4} \frac{\partial^2 G}{\partial V_g^2} \left(\frac{V_g^{dc}}{C_g^{dc}} \frac{\partial C_g}{\partial u} \right)^2 u_{ac}^2$$



Goals:

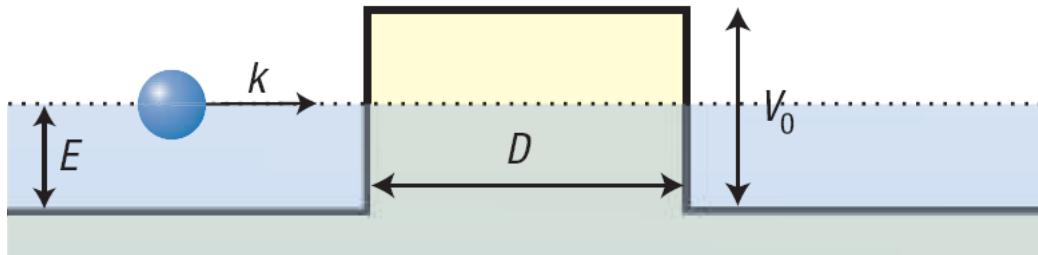
- 1) Test the influence of the environment on high quality nanotube resonator
- 2) Study superconducting properties of this device

Work done in collaboration with
J.-P. Kaikkonen (instructor)

Klein tunneling and Quantum Hall effect (QHE)

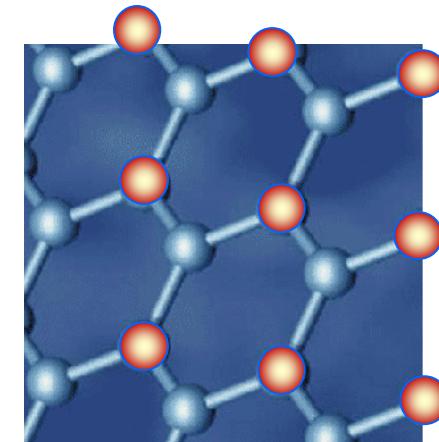
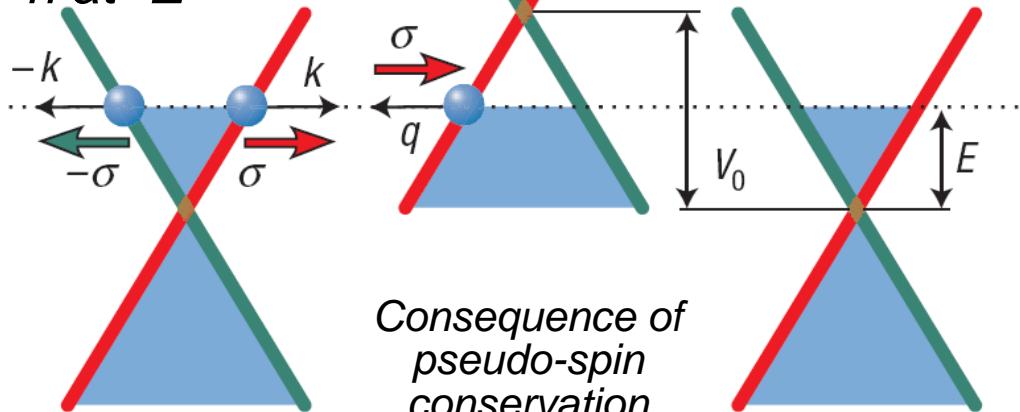
Tunneling through a broad barrier:

O. Klein, Z. Phys 53, 157 (1929); 41, 407 (1927)



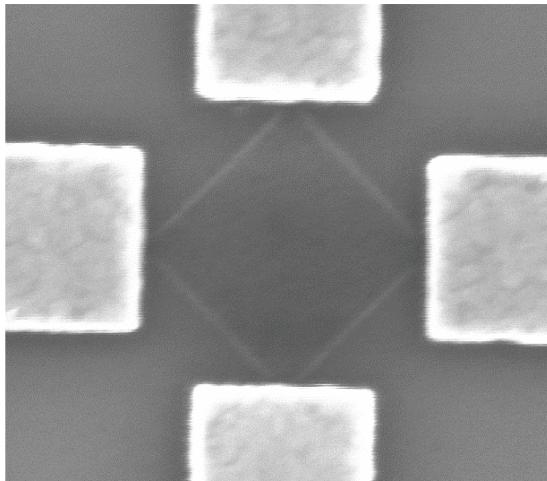
e at energy
 E has the
same spin as
 h at $-E$

M.I. Katsnelson, K. Novoselov,
A. Geim, Nature Physics, 2006

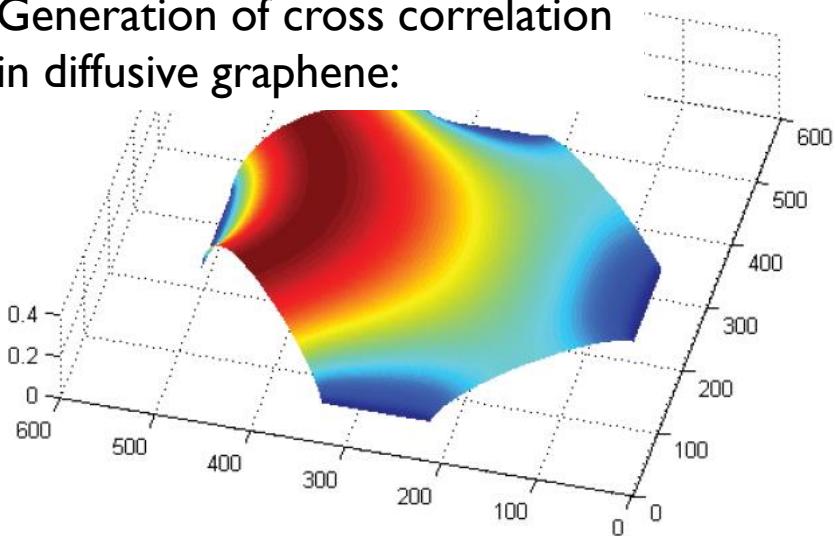


Goal:
To investigate QHE in
suspended graphene
in Corbino geometry,
especially tunneling
through the sample
See: arXiv:1611.02742

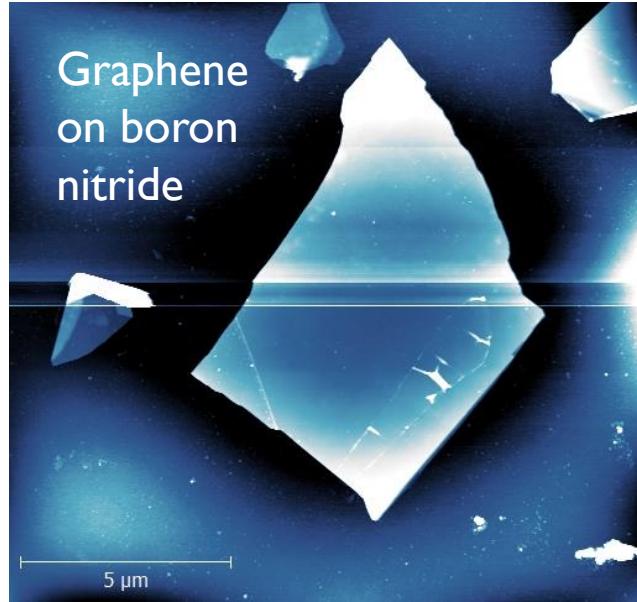
Quantum interference with relativistic electrons



Generation of cross correlation
in diffusive graphene:



Interference in the relativistic regime?
In general: UH quality graphene experiments



Goal:
To investigate a ballistic
graphene box on boron-nitride
and measure cross correlations
at a frequency of ~1 GHz

Work in collaboration with
Teemu Nieminen 040 7346496