



INSTITUTE of RADIOPHYSICS and ELECTRONICS NAS of UKRAINE

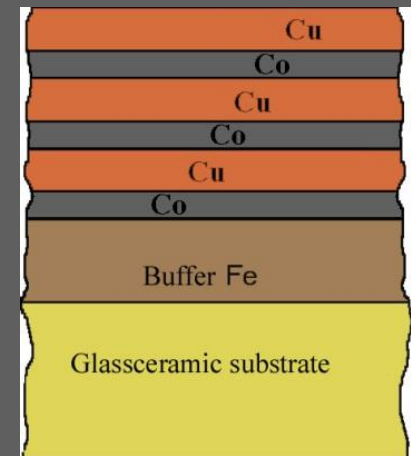
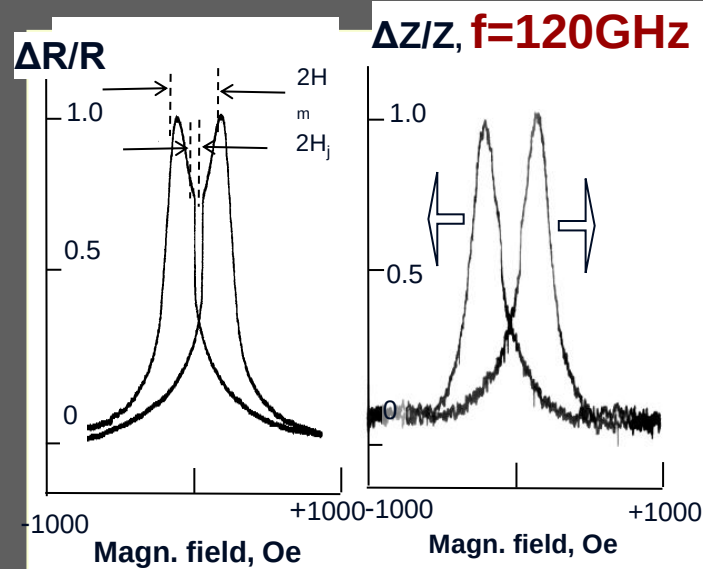
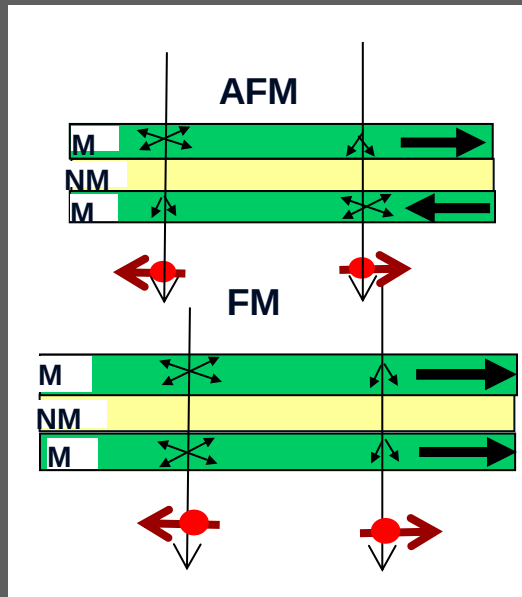
Part 2

**Radiospectroscopy
Department**

2016



GMI/GMR – Giant Magnetoimpedance/ Magnetoresistance in magnetic nanostructures

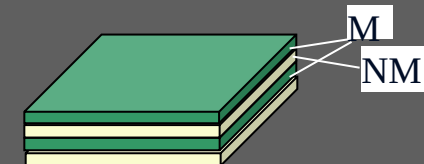
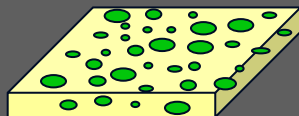


Types of nanostructures for study in dept

Granular structures

Microwires

Multilayered structures



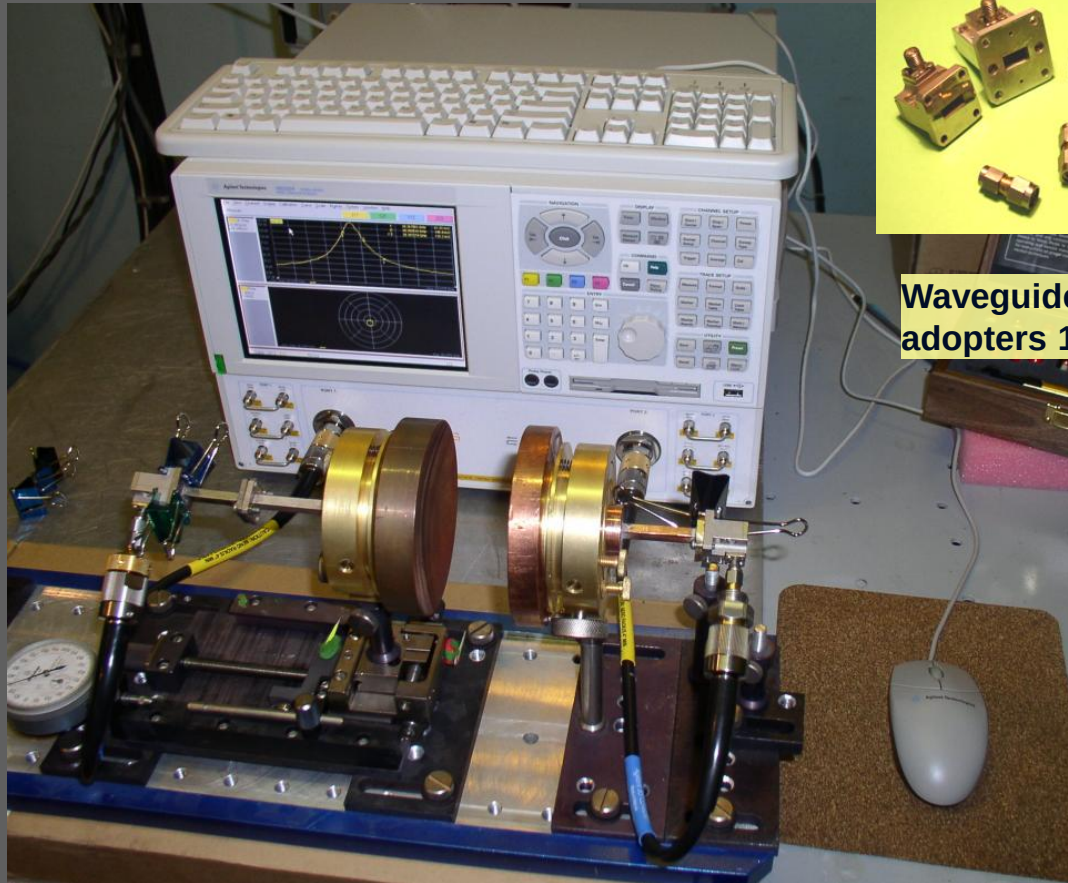
0D-structure

1D-structure

2D-structure



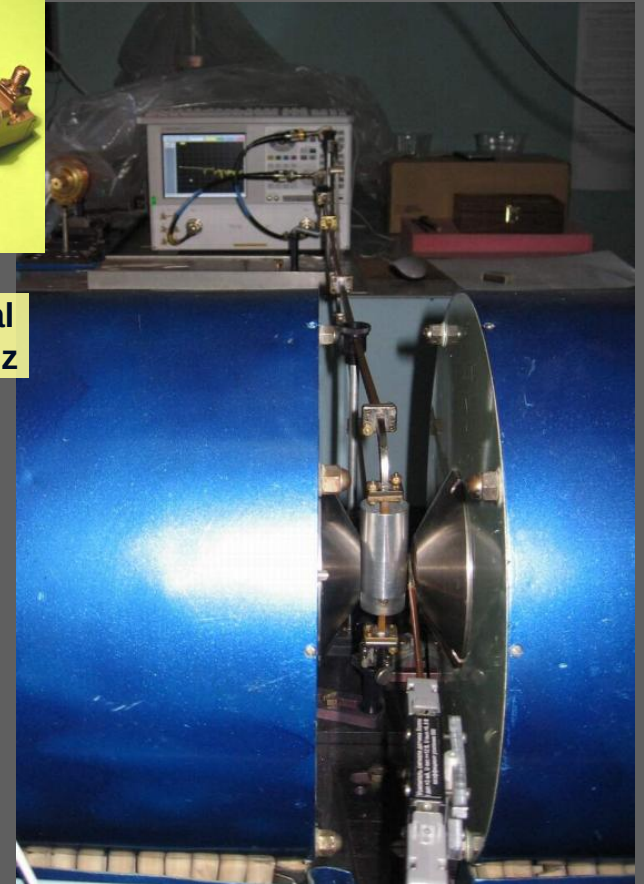
Vector Network Analyzer *Agilent NA5230A* as a component of Radiospectroscopy complexes for researches at $f = 50 \text{ MHz} - 40 \text{ GHz}$



NA with Open Resonator research unit



Waveguide-coaxial
adapters 10-40GHz



NA with Giant Magnetoimpedance cell

1D magnetotunable metamaterials design in IRE



Manganite-perovskite + teflon



Ferrite + wire medium



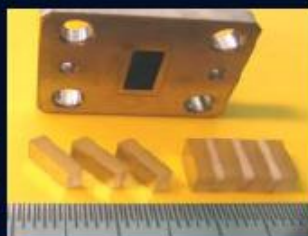
Left Handed prisms



wire medium



Split-rings resonators + WM



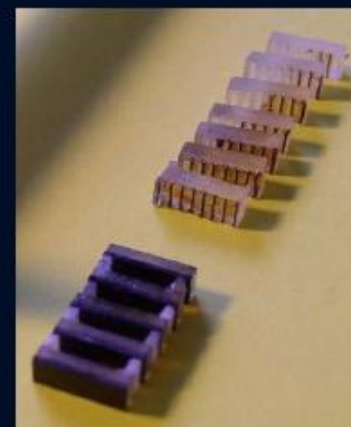
Ferrite + metal layer



1D-



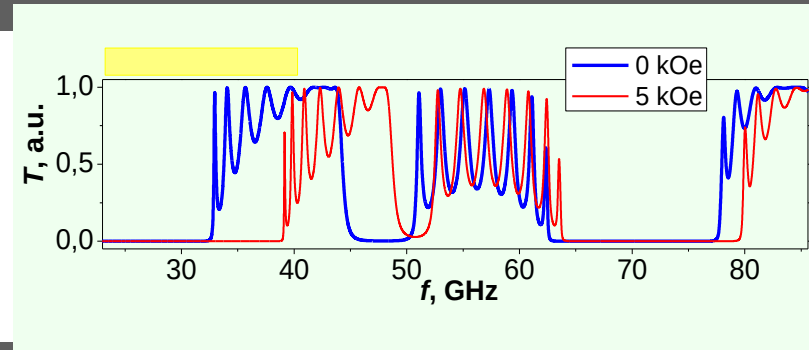
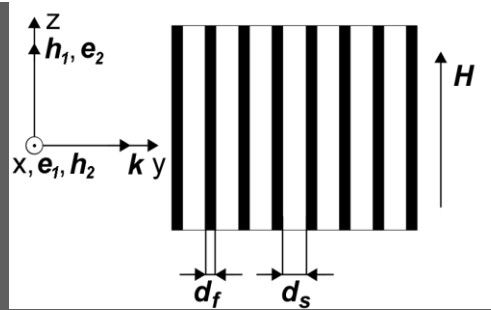
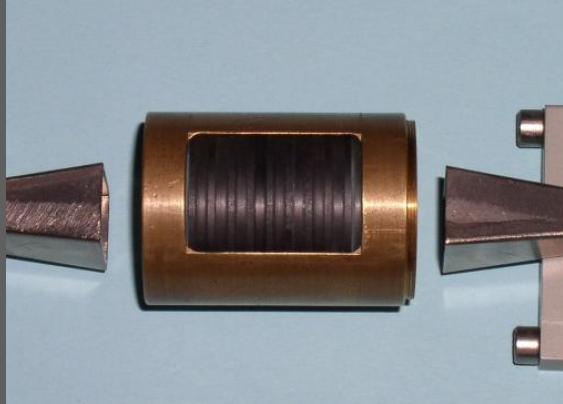
2D- metamaterial



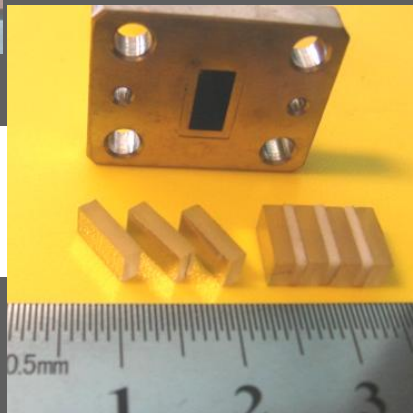


Magnetophotonics. Ferrite Based 1D photonic crystals

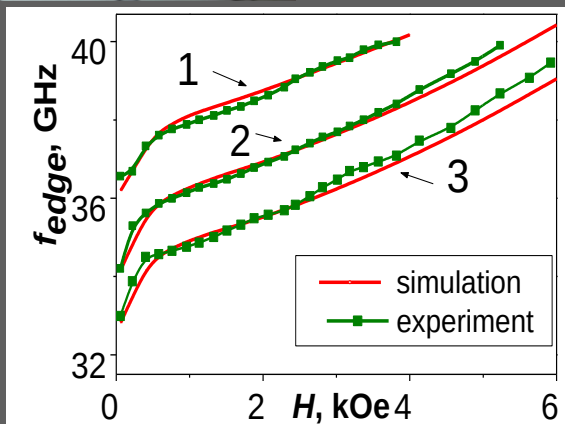
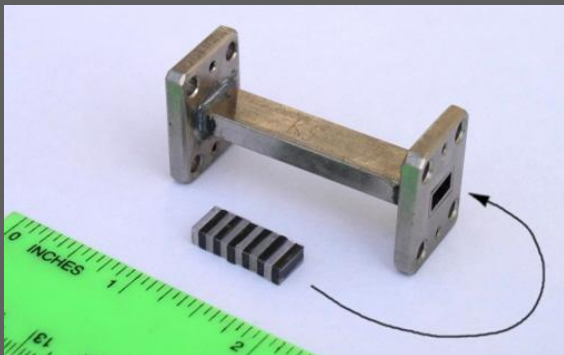
Ferrite MPC in “quasi”-ambient space



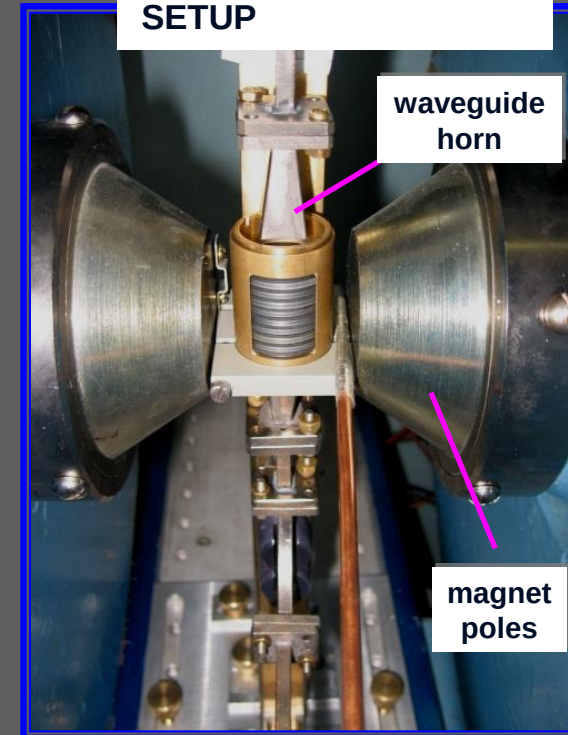
Metal-dielectric MPC in waveguide



Ferrite MPC in waveguide



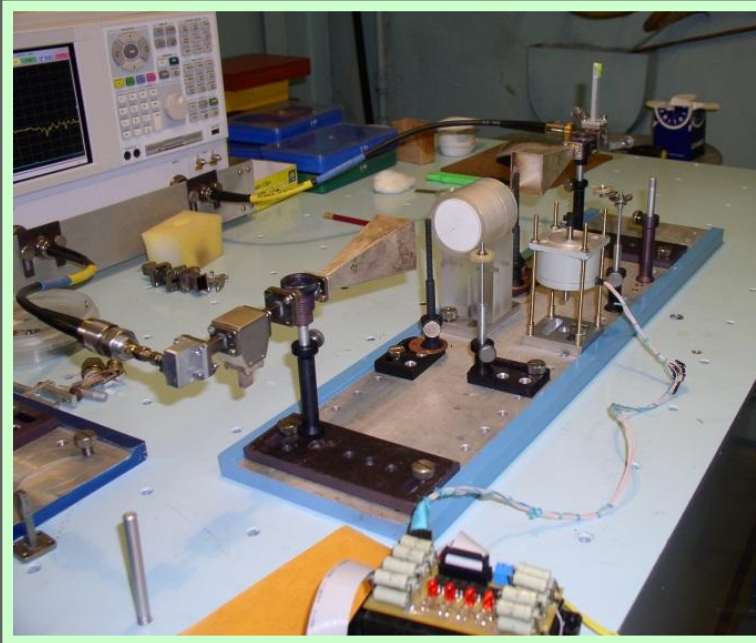
EXPERIMENTAL SETUP



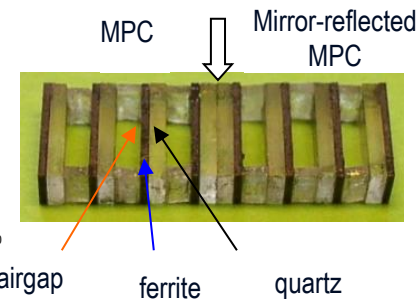
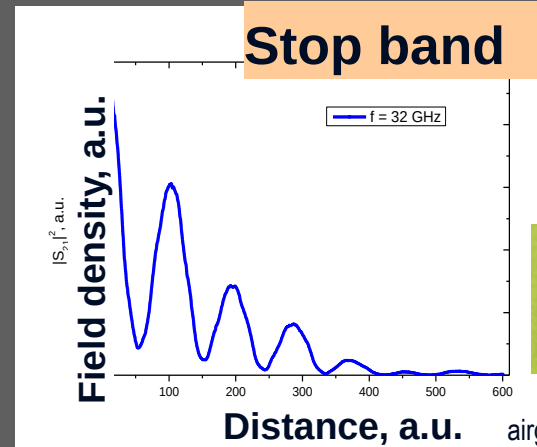
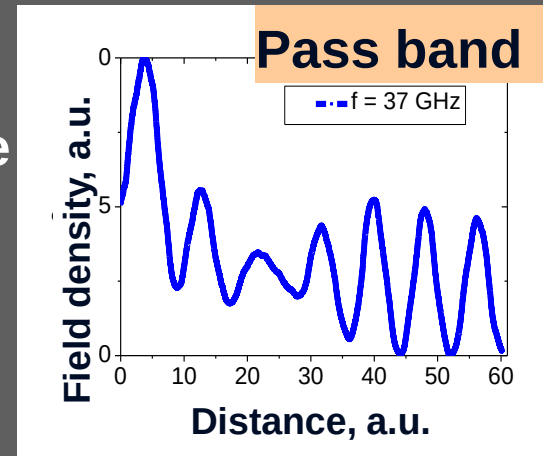


Experiment.

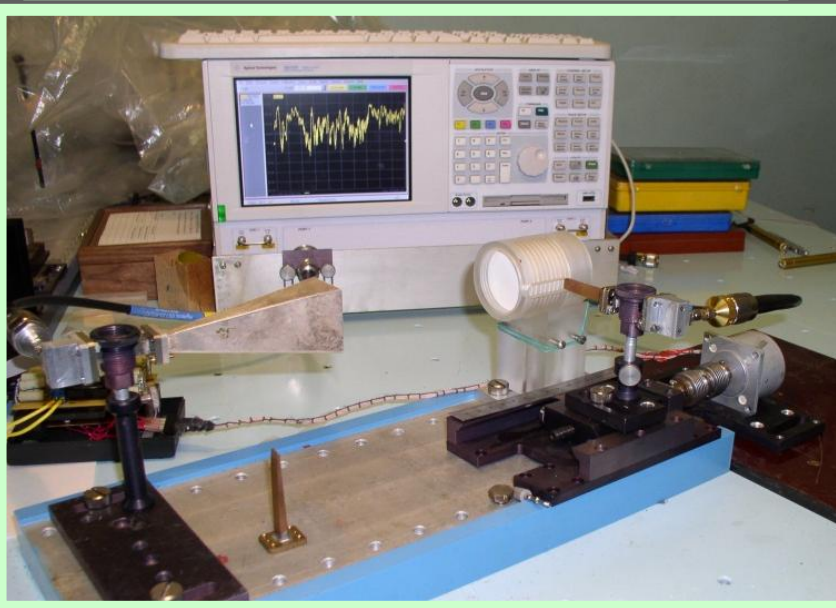
Field distribution in the MagnetoPhotonic Crystals (MPC)



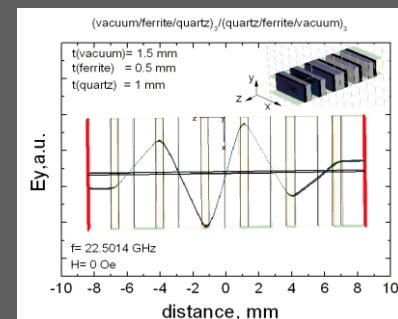
Passive
probe



airgap ferrite quartz



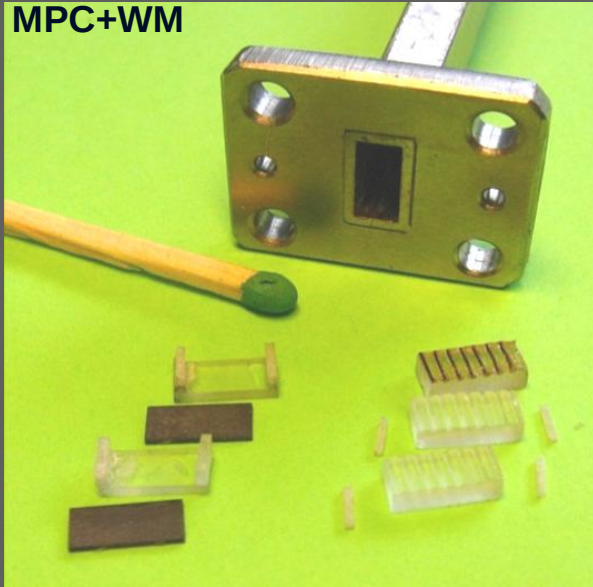
Active
probe





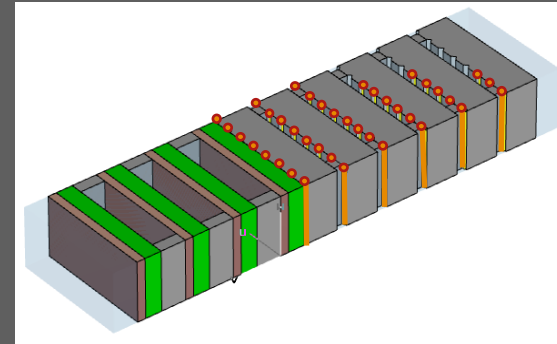
Tamm state in magnetophotonic crystal + wire medium

MPC+WM



$$\sqrt{\frac{\epsilon}{\mu}} = \frac{m_{21} - \zeta_2(m_{11} - e^{j \cdot k_B d})}{m_{22} - e^{j \cdot k_B d} - \zeta_2 m_{12}} \Big|_{k_x=0}$$

“Tamm” peak position depends on H-field applied!!!



Stop band edge

