

# COMBINED MAGNETIC FIELD NOISE OF DIFFERENT GENERATION EFFECT ON THE OBSERVATION OF GRAVITROPIC REACTION CHANGES IN SUPERWEAK COMBINED MAGNETIC FIELD

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# THE BASE AND IDEA OF THE WORK

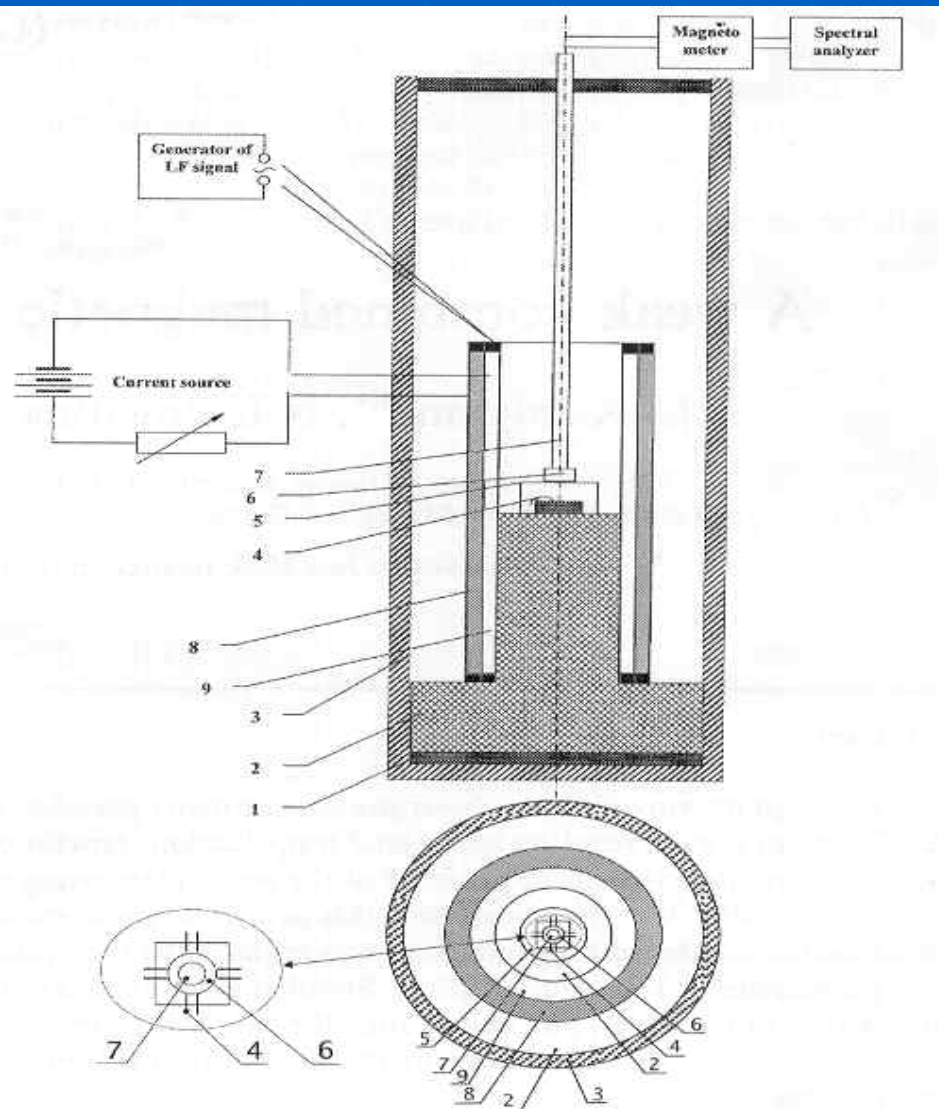
- It is known for a long time that the MF fluctuation (magnetic storm for instance) influences on a lot of alive organisms from the simplest sea weeds and until human being and animals.
- But the results obtained under usual Earth conditions are reproduced not well enough.
- **The first purpose** was to obtain well reproducible magnetic conditions.

# The method used for obtaining well reproducible conditions

The shielding of external MF in work volume and creation in it the artificial MF with desired characteristics in it.

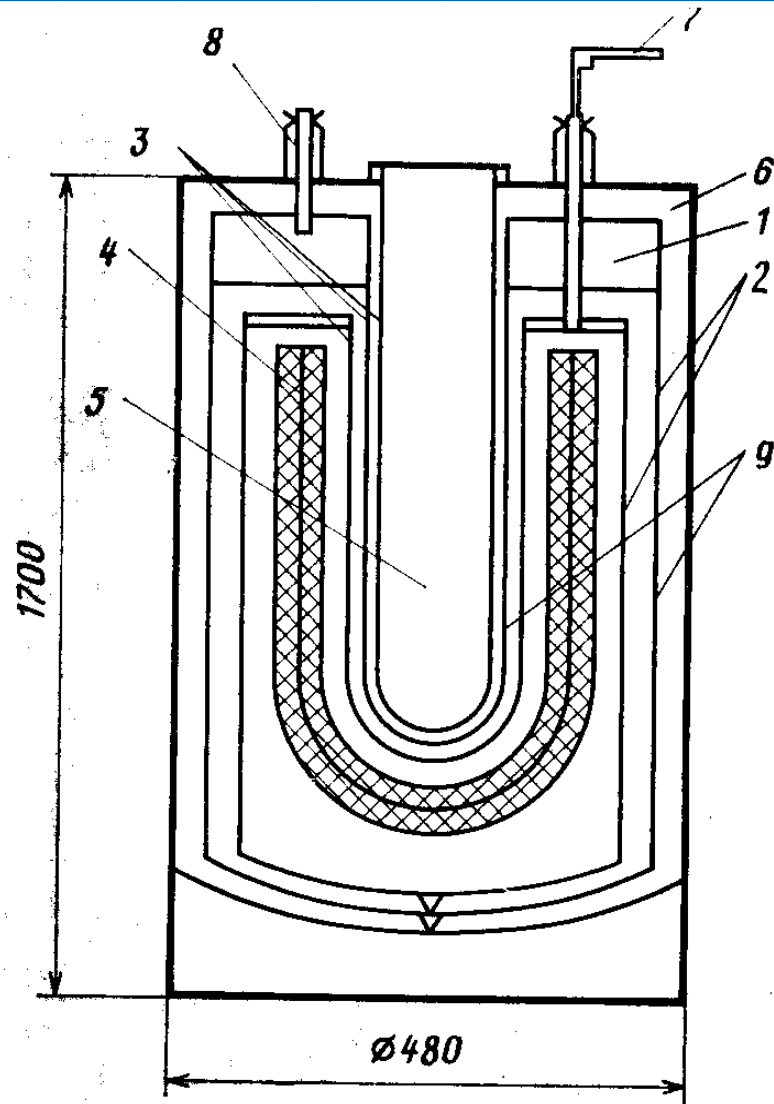
- 1 method is the using of  $\mu$ -metal shield
- 2 method is the using superconductive shield

# Scheme of experiment with $\mu$ -metal shield



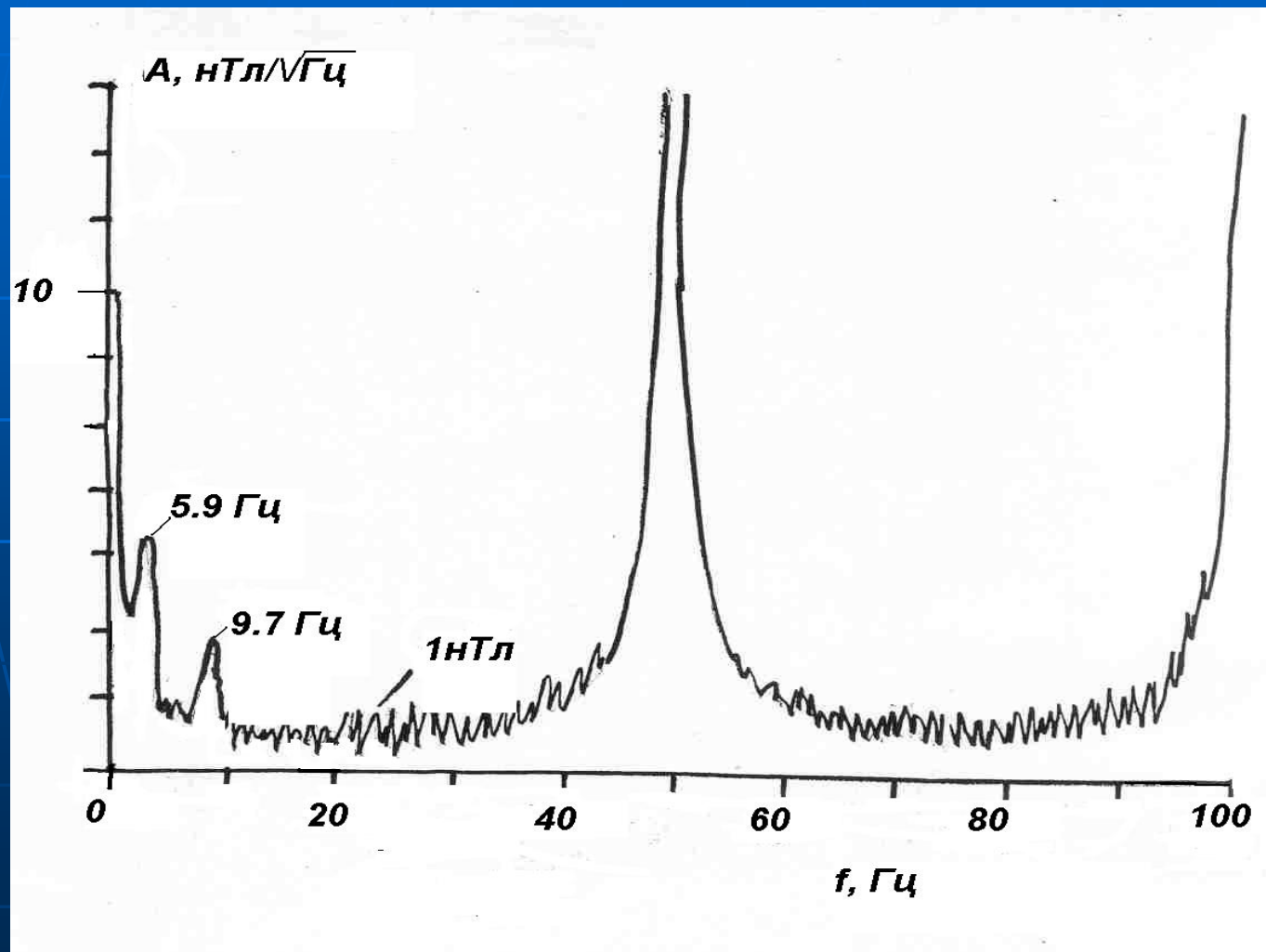
The damping rubber (1) supported the holder of dielectric material (2). The  $\mu$ -metal shield (3) surrounded the samples (4) that were mounted inside a moist chamber of non-magnetic plastic material (5) and solenoids (8, 9). The magnetic field was measured and controlled by sensor elements (fluxgate magnetometer or SQID), (6) inside a holder (7). The solenoids (8, 9) have a cylindrical shape and comprise the system that generates the static magnetic field (9). Both static and alternating magnetic fields are oriented parallel to the central axis. The enlarged central part of the top view shows the orientation of 4 pairs of roots (4), arranged around the magnetic field sensor (7). The coils of solenoids (8, 9) are the spaces between the circles in the bottom part. The space between the innermost circle is the holder of dielectric material (2).

# Scheme of experiment with superconducting shield



1 – volume for liquid nitrogen, 2 – external helium cryostat, 3 – isolating cryostat, 4 – superconducting magnetic shield, 5 – warm volume for work, 6 – the upper cover, 7 – the tube for liquid helium pouring, 8 – the tube for liquid nitrogen pouring, 9 – nitrogen screens of isolating 3 and external helium cryostats.

# The dependence of amplitude of spectral density of magnetic noise for the system: $\mu$ -metal shield + flux gate magnetometer

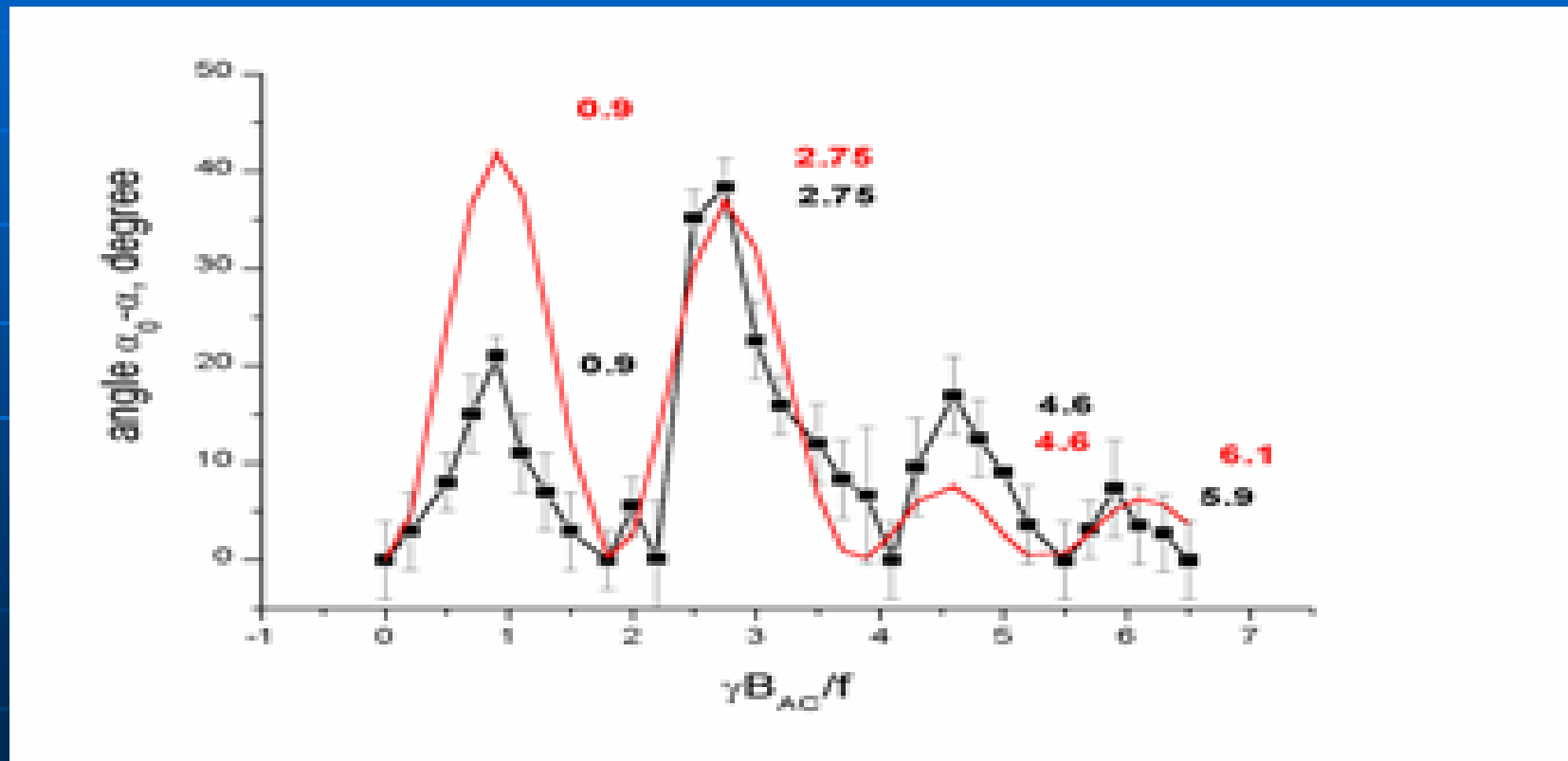


# The artificial magnetic noise creation

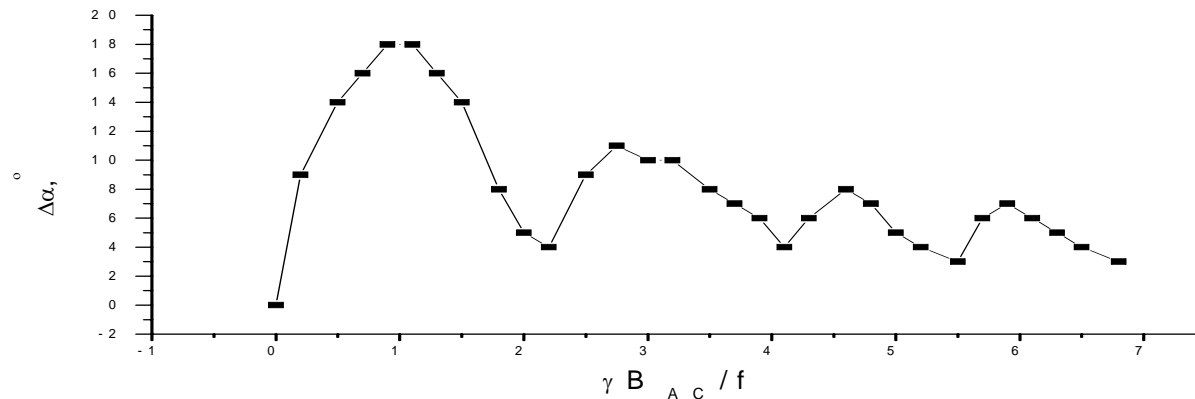
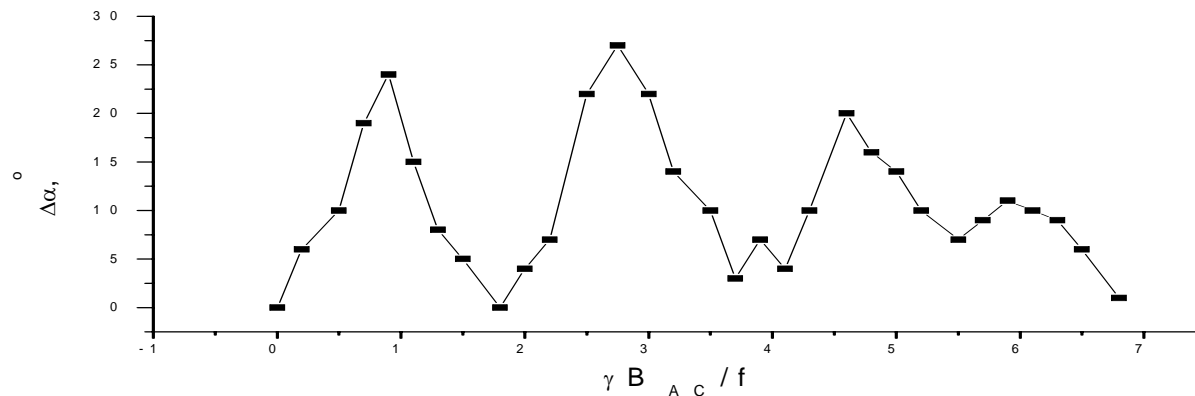
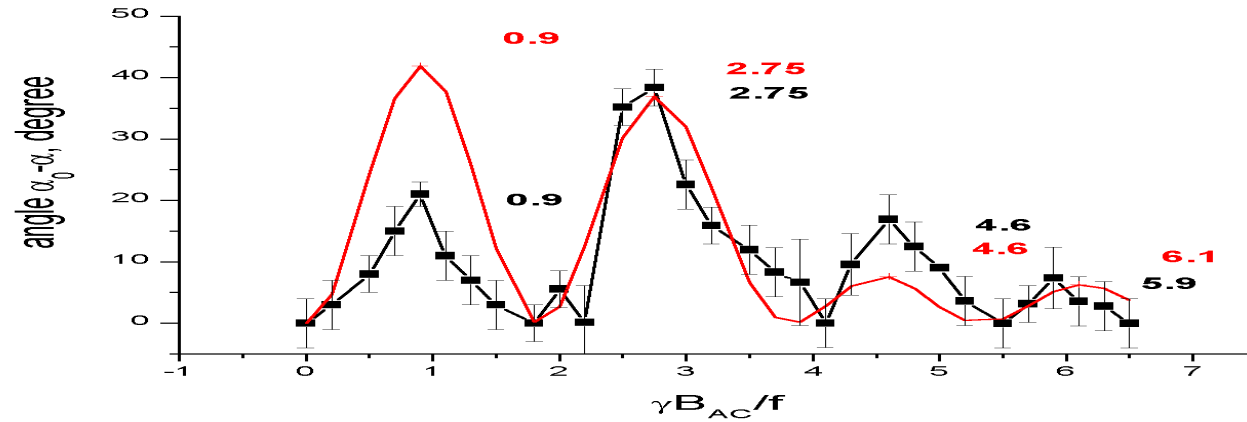
The artificial magnetic noise was created by noise generator switched on parallel with the generator of used frequency.

# RESULTS

Comparison of experimental results with the theoretical curve

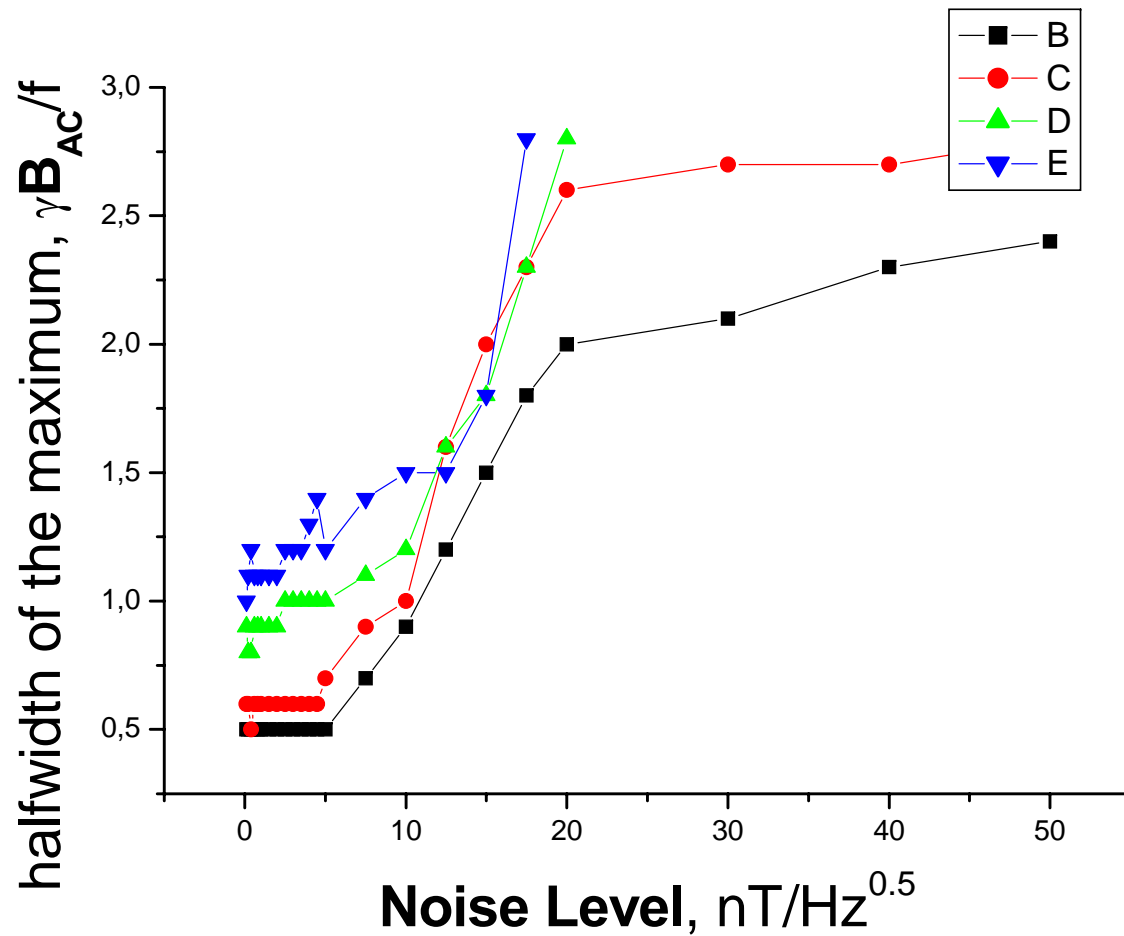






The dependence of biological effect on the ratio  $\gamma B_{AC}/f$  at different noise level: 1; 5 and 15  $\text{nT}/\text{Hz}^{0.5}$

# The dependence of maxima halfwidth on the noise level



B - 1 maximum,  
C - 2 maximum,  
D - 3 maximum,  
E - 4 maximum

# CONCLUSIONS

1. The form of the curve depends on the magnetic noise level.
2. At the low noise level the discrepancy from the theoretic curve is maximum.