ELECTROMAGNETIC ASSIGNMENT

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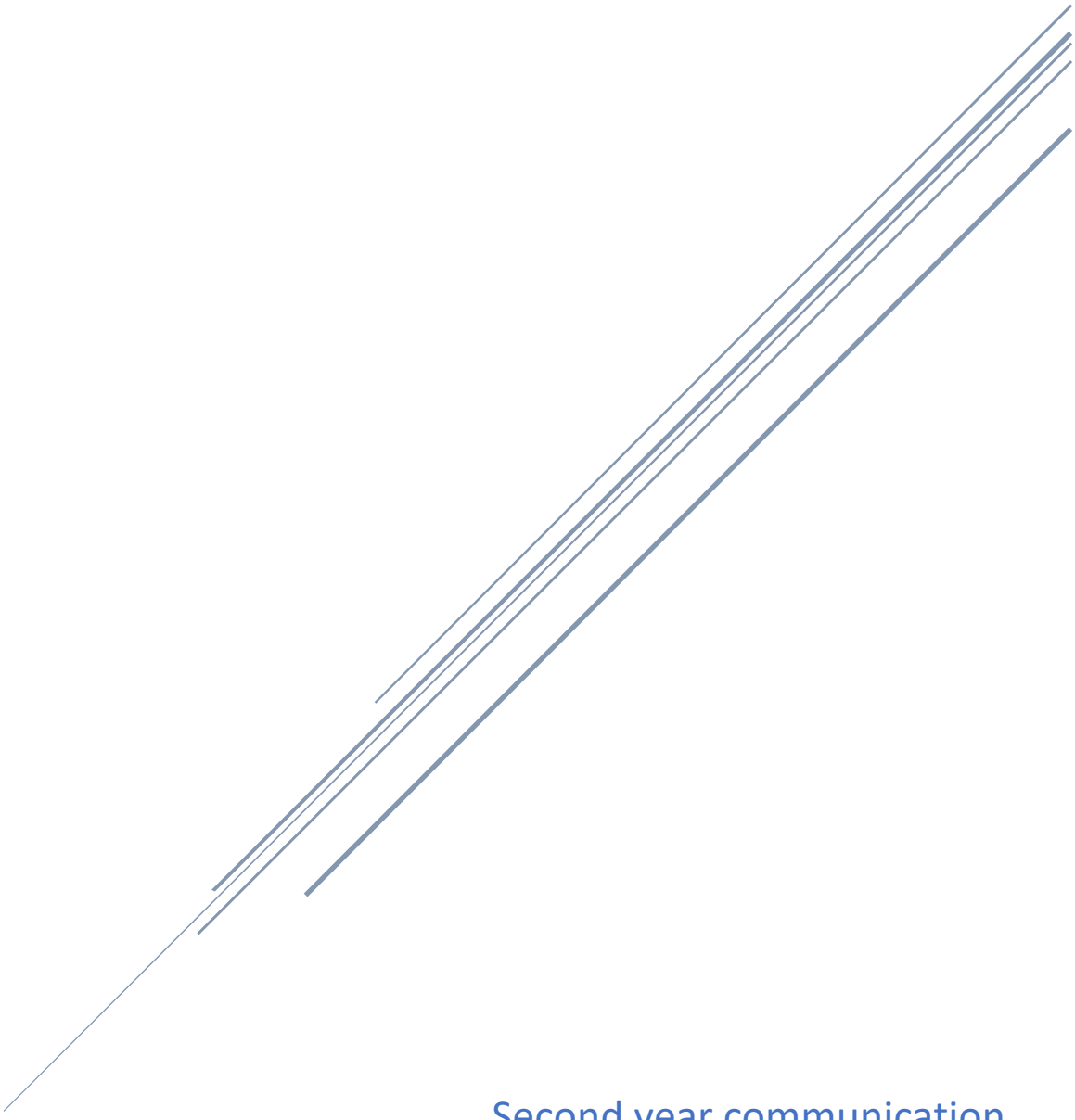

Second year communication

First experiments : MIM capacitor

1-

a.Tuning Capacitors/Radio Capacitor: Due to their normally high allowance for holding charge

b. Variable Capacitor

A typical variable air capacitor used in radio frequency circuits is composed of two arrays of parallel conductive plates in a single assembly

c. Compression Capacitor:

The main components in a compression capacitor include a holder frame

d. **Piston Capacitor:**

A standard variable piston capacitor is composed of a metal piston

e. Straight-Line Capacitance:

In a variable air capacitor, the capacitance level at a given setting depends on the degree of shading or coverage of the rotor plates by the stator plates

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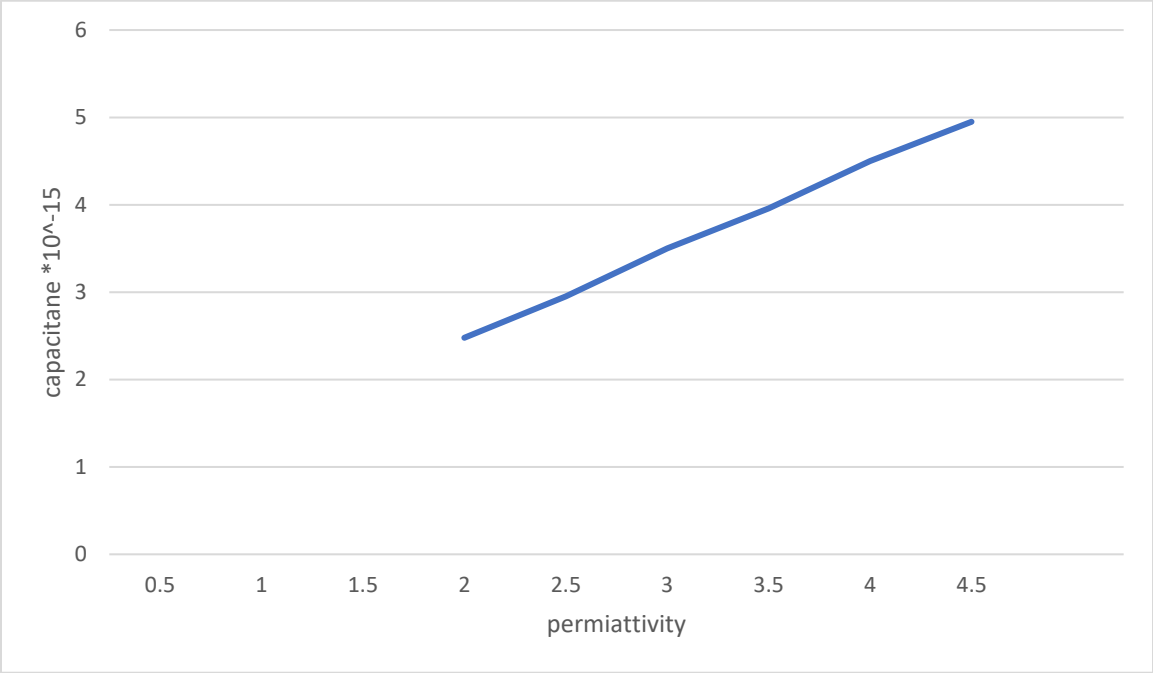
2-C = Q / V

Relative permittivity	2	*2.5*	*3*	*3.5*	*4*	*4.5*
Capacitance *10^15	*2.478*	*2.95 µF*	*3.5*	*3.96 µF*	*4.5*	*4.95*

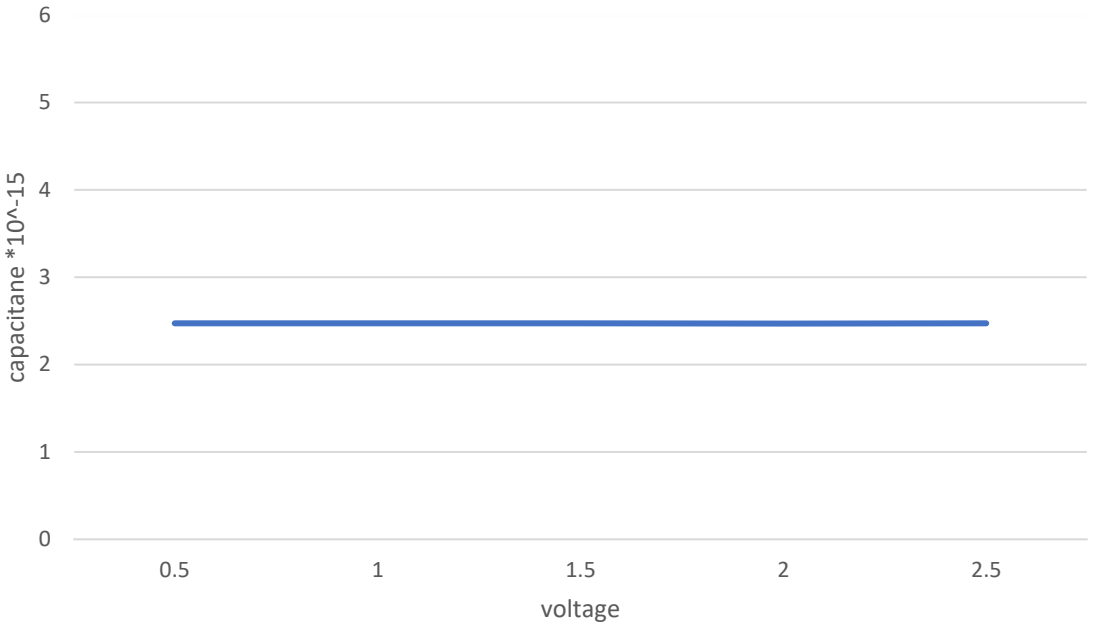
3-



4-

Voltage	.5	1	1.5	2	2.5
Capacitance **10^15*	*2.471*	*2.471*	*2.472*	*2.469*	*2.475*

5-



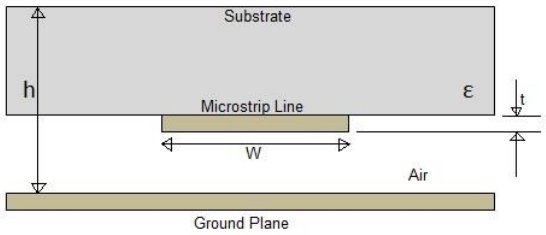
Second Experiment:

Microstrip transmission lines

1-patterns of microstrip :

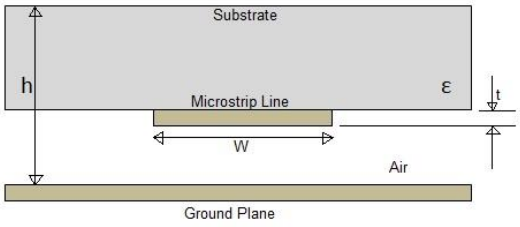
There are many patterns of microstrip lines the main ones are :

- Inverted



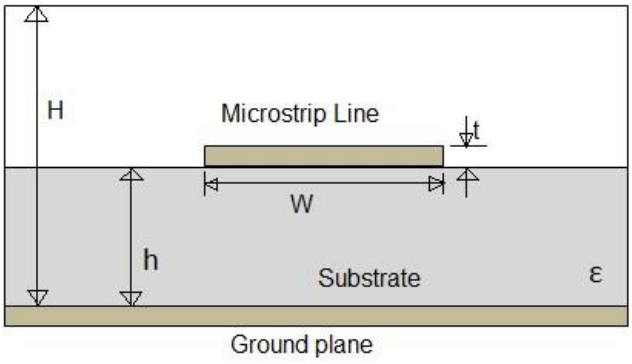
Inverted Microstrip Line

- -suspended



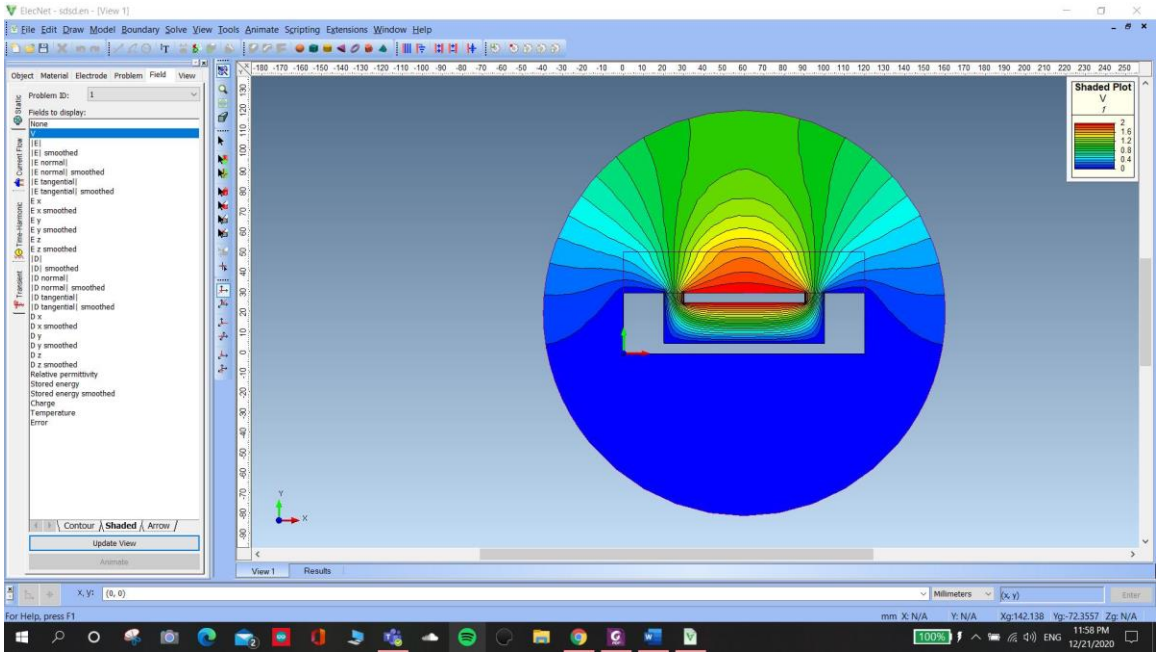
Inverted Microstrip Line

-shielded



Shielded Microstrip Line

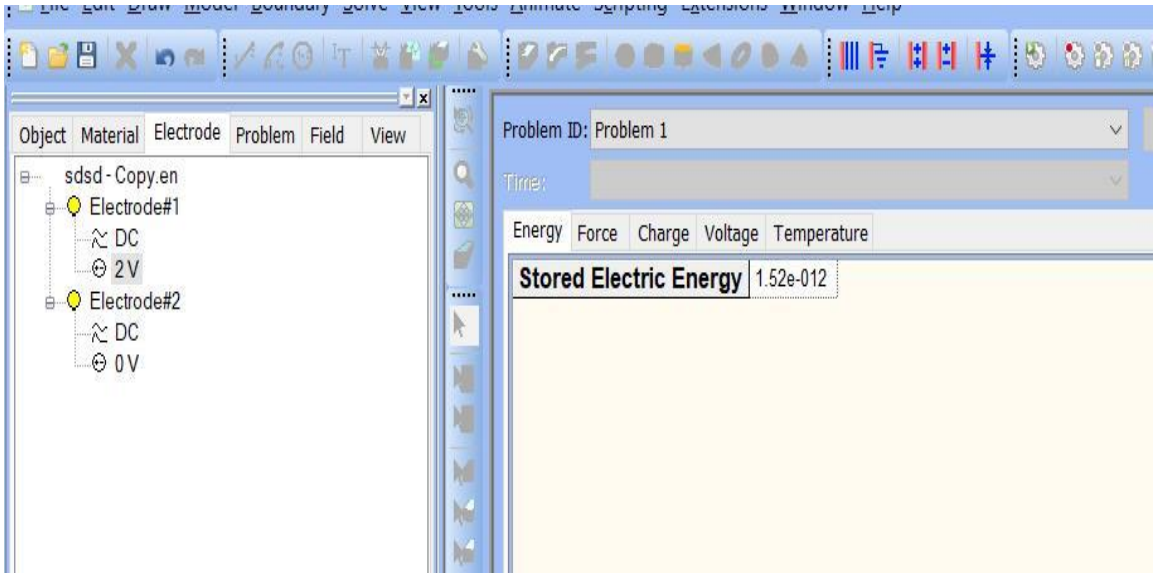
2-



Comment :That graph shows that the lines of the field has high intensity near

to the source and the intensity decreases more and more and when face the air box side some few lines reflect and diffuse

3-



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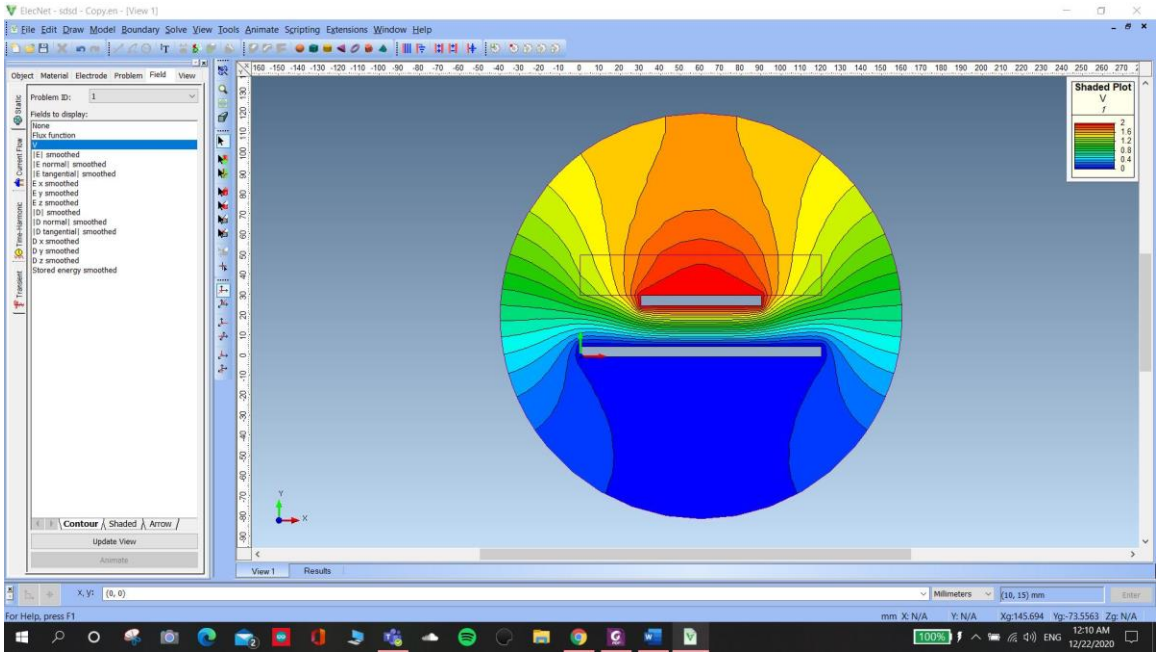
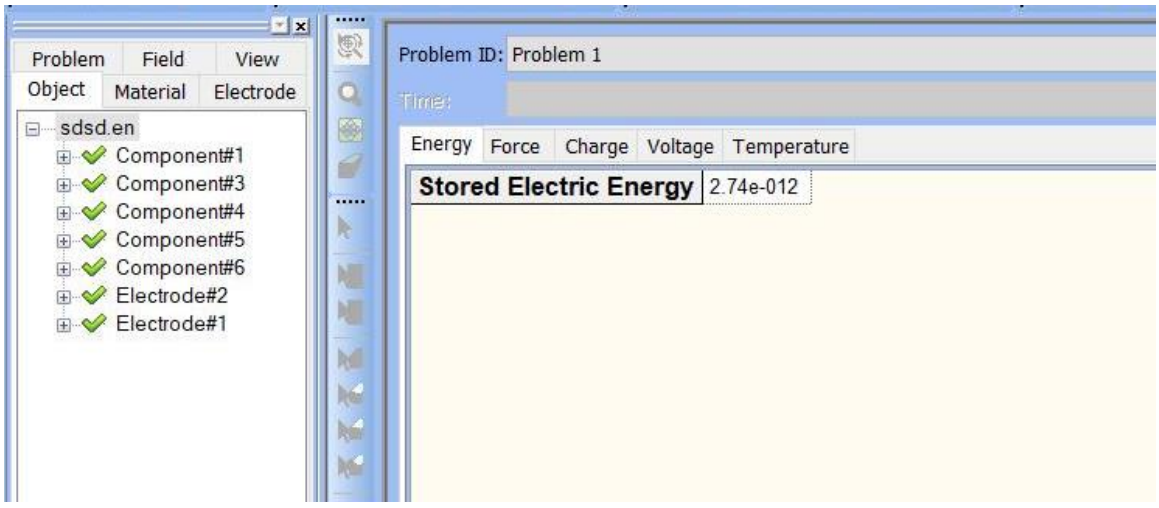


Comment: near the core and the metal there is high intensity and it diffuses in the direction of current distribution



Third experiment :

Magnetic Buzzer

1- Working Principle of Magnetic Buzzers

The vibrating disk in a magnetic buzzer is attracted to the pole by the magnetic field. When an oscillating signal is moved through the coil, it produces a fluctuating magnetic field which vibrates the disk at a frequency equal to that of the drive signal

2-Piezo vs. Magnetic Buzzers

Piezo Buzzer Characteristics

- Wide operating voltage: 3~250 V

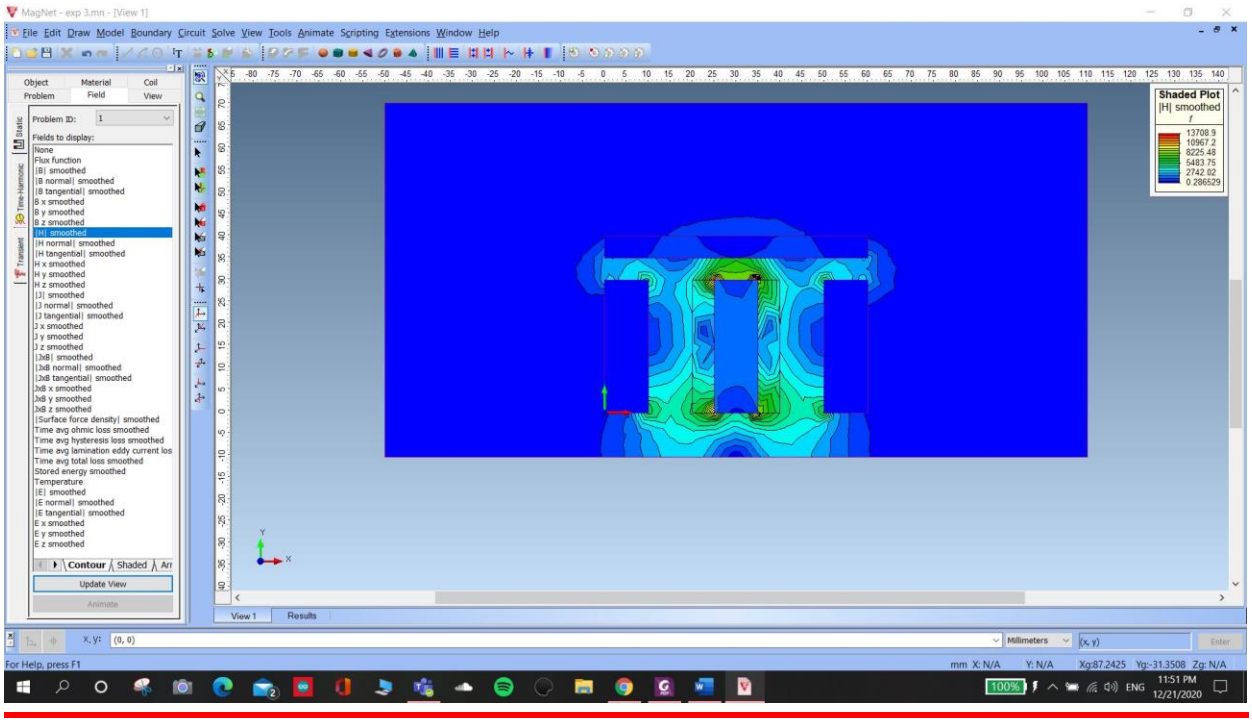
- Lower current consumption: less than 30 mA higher rated frequency
- Larger footprint
- Higher sound pressure level

Magnetic Buzzer Characteristics

- Narrow operating voltage: 1~16 V
- Higher current consumption: 30~100 mA
- Lower rated frequency
- Smaller footprint
- Lower sound pressure level

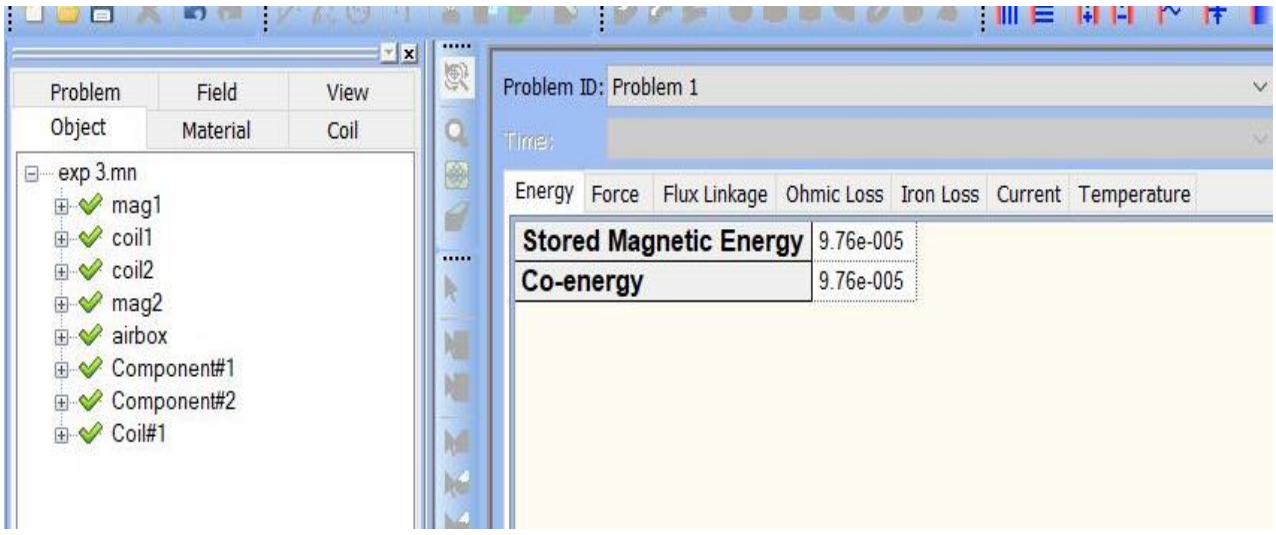
CUI Devices' buzzer line utilizes two main technologies, magnetic and piezoelectric. And their available mounting configurations allow for consumers to utilize CUI Devices' broad product line depending on the application need.

3-



Comment : magnetic field spread in the parts of the permeable material

4-

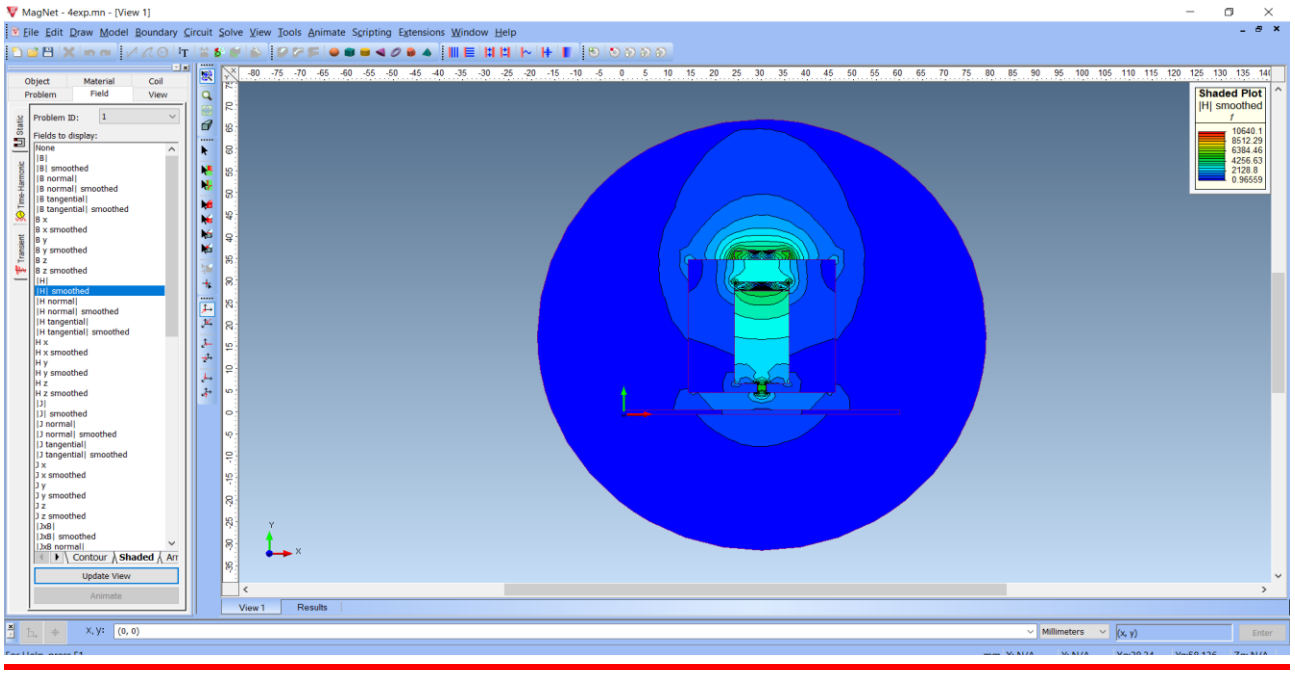


Fourth experiment :

Tape recording

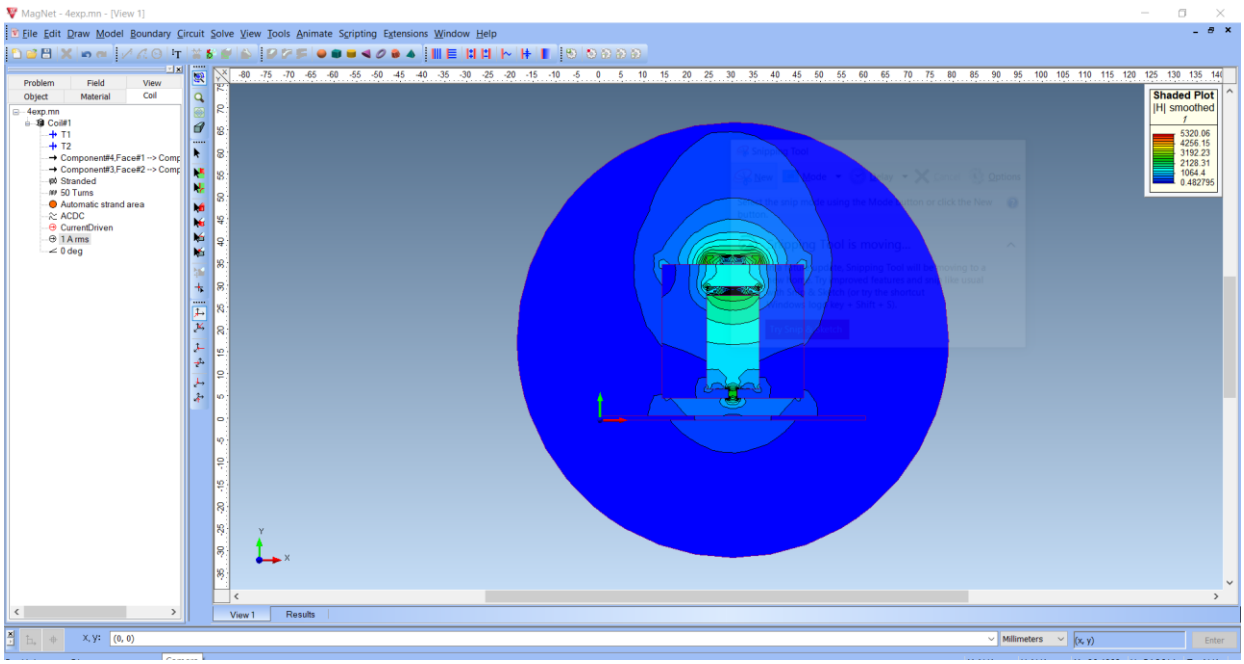
1- ***An electric current in a coil of wire produces a magnetic field similar to that of a bar magnet, and that field is much stronger if the coil has a ferromagnetic (iron-like) core.Tape heads are made from rings of ferromagnetic material with a gap where the tape contacts it so the magnetic field can fringe out to magnetize the emulsion on the tape. A coil of wire around the ring carries the current to produce a magnetic field proportional to the signal to be recorded. If an already magnetized tape is passed beneath the head, it can induce a voltage in the coil. Thus the same head can be used for recording and playback.The basic tape head action involves an oscillating current in a coil. The magnetic field produced in a ring of ferromagnetic material fringes out to the tape material at the gap. For stereo cassette tape heads, there are two such mechanisms to record and playback from parallel tracks on the tape.The recording medium for the tape recording process is typically made by embedding tiny magnetic oxide particles in a plastic binder on a polyester film tape. Iron oxide has been the most widely used oxide, leading to the common statement that we record on a "ribbon of rust". But chromium oxide and metal particles provide a better signal-to-noise ratio and a wider dynamic range. The oxide particles are on the order of 0.5 micrometers in size and the polyester tape backing may be as thin as 0.5 mil (.01 mm). The oxide particles themselves do not move during recording. Rather their magnetic domains are reoriented by the magnetic field from the tape head.***

2-



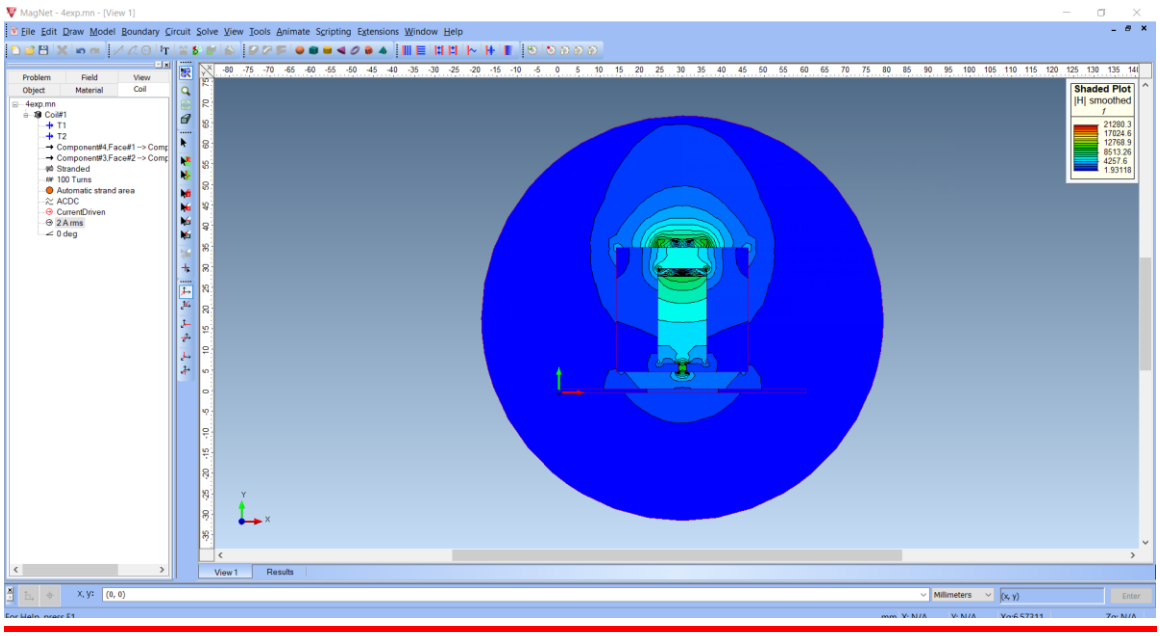
Intensity of the field in the direction of the spreadness of the current

3-



The relation between current and field intensity centrifugal reduction faces reduction

4-



Comment:When we duplicate the current and the number of turns the intensity duplicates twice