**ABSTRACT**

Numerous Imaging technologies have been in use in airports, buildings and different establishments to prevent potential threats to security. However, those imaging devices could reach up to tens of thousands of dollars to purchase and install. Our research solves this issue by implementing an Eddy current imaging technology which uses inexpensive inductance sensors to detect and image metals. This in turn will provide an alternative affordable means to prevent those security threats such as weapons and explosives before they cause harm to our society.

**UNDERLYING PRINCIPLE**

- **Faraday’s and Lenz’s Law**
  - **Faraday’s Law** states that a changing magnetic field in a conductor induces an electromotive force. 
  - **Lenz’s Law** states that the direction of the current induced in a conductor by a changing magnetic field is such that the magnetic field created by the induced current opposes the initial changing magnetic field.

$$E = -N \frac{\Delta \Phi}{\Delta t}$$

**OBJECTIVES**

**Overall Objective:**
Detect and image metals for security applications by using eddy current imaging technology

**Specific Objective:**
Image metals that can be located at different depth

**RESULTS**

**Image reconstruction algorithm**

[involves fourier transform and solution of system of linear equation]

**DISCUSSION**

- The inductive sensor has an LC circuit that serves as a resonator.
- The LC tank operates in resonance mode without the presence of metals.
- LDC sensors convert the inductance value to a digital value.
- In the presence of metals the resonance frequency of the LC tank changes.

$$F_r = \frac{1}{2\pi\sqrt{LC}}$$

**CONCLUSIONS**

Eddy current Imaging technology provides a cheap and affordable metal detection means for security purposes. The governing principles of the technology makes the system reliable and sustainable. We have shown the capability of image reconstruction in various depth.

**REFERENCES**

- Faraday’s Law, [hyperphysics.phy-astr.gsu.edu/hbase/electric/farlaw.htm](http://hyperphysics.phy-astr.gsu.edu/hbase/electric/farlaw.htm)

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