

# SAW Sensor for Surgical Arm using Piezoelectric Devices

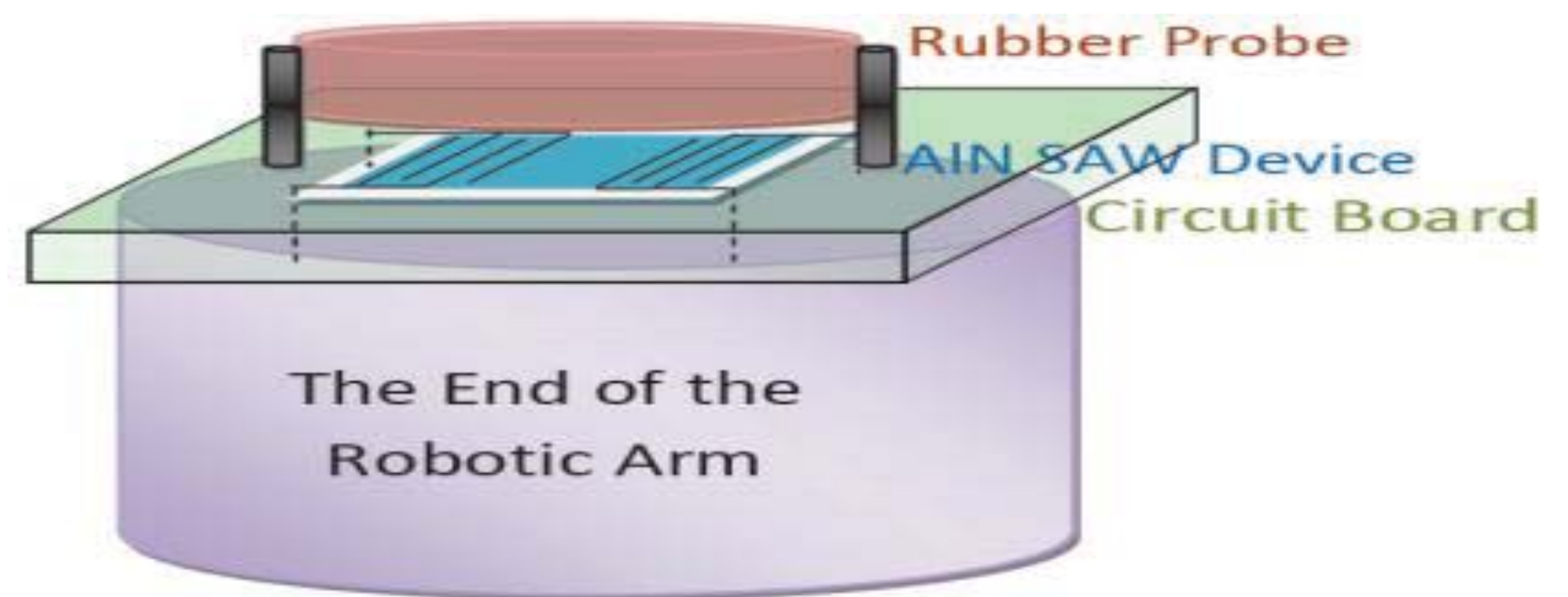
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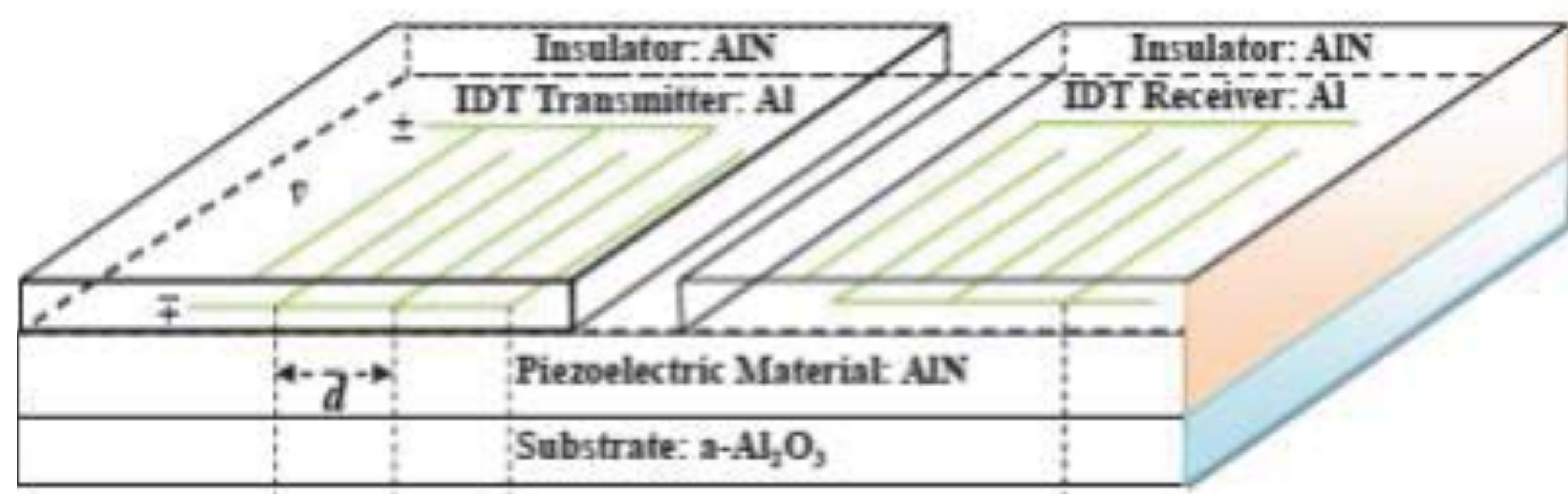


The interaction, i.e. artificial sensing between the robot and the patient is still very limited. With the help of various cameras, vision is almost the only feeling that a robot can have.

## Introduction

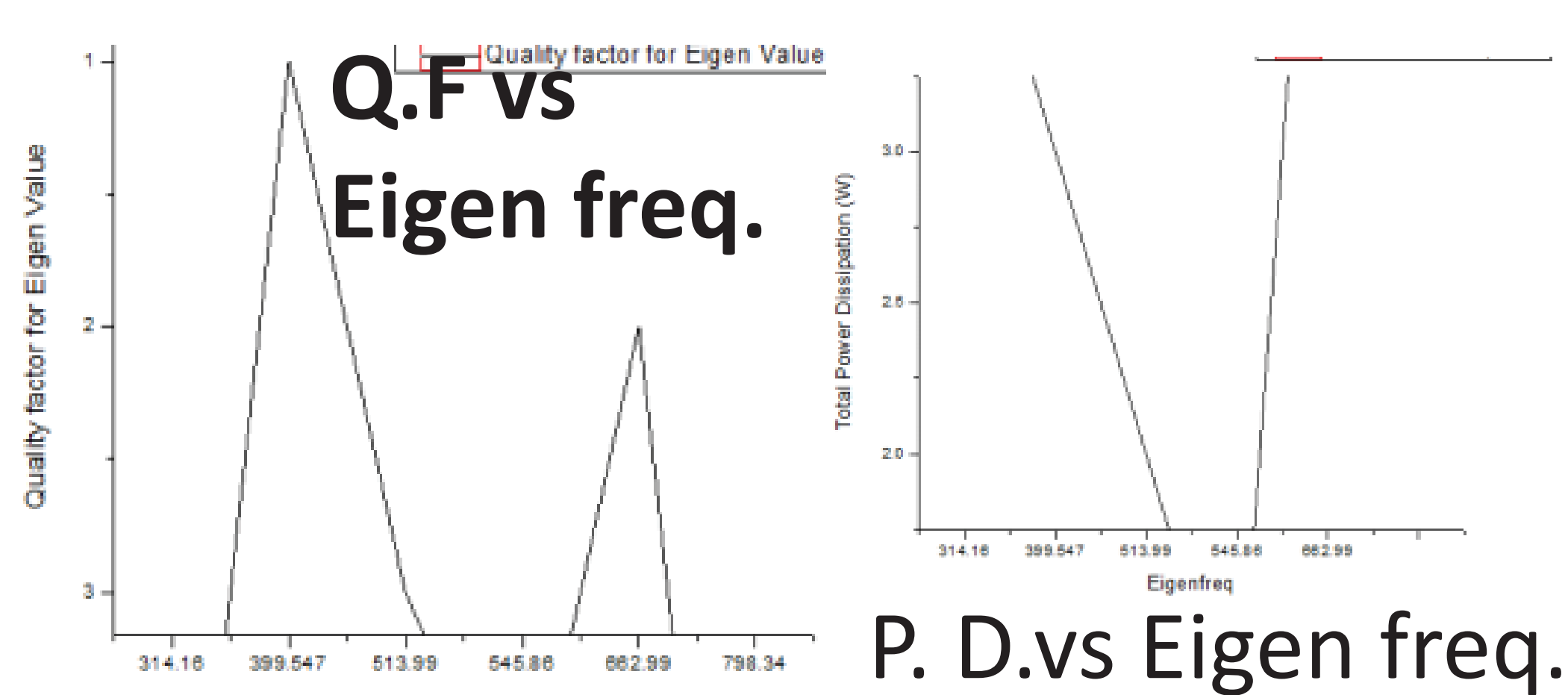


Schematics of a prototype of SAW sensor in order to bring the feelings like skin

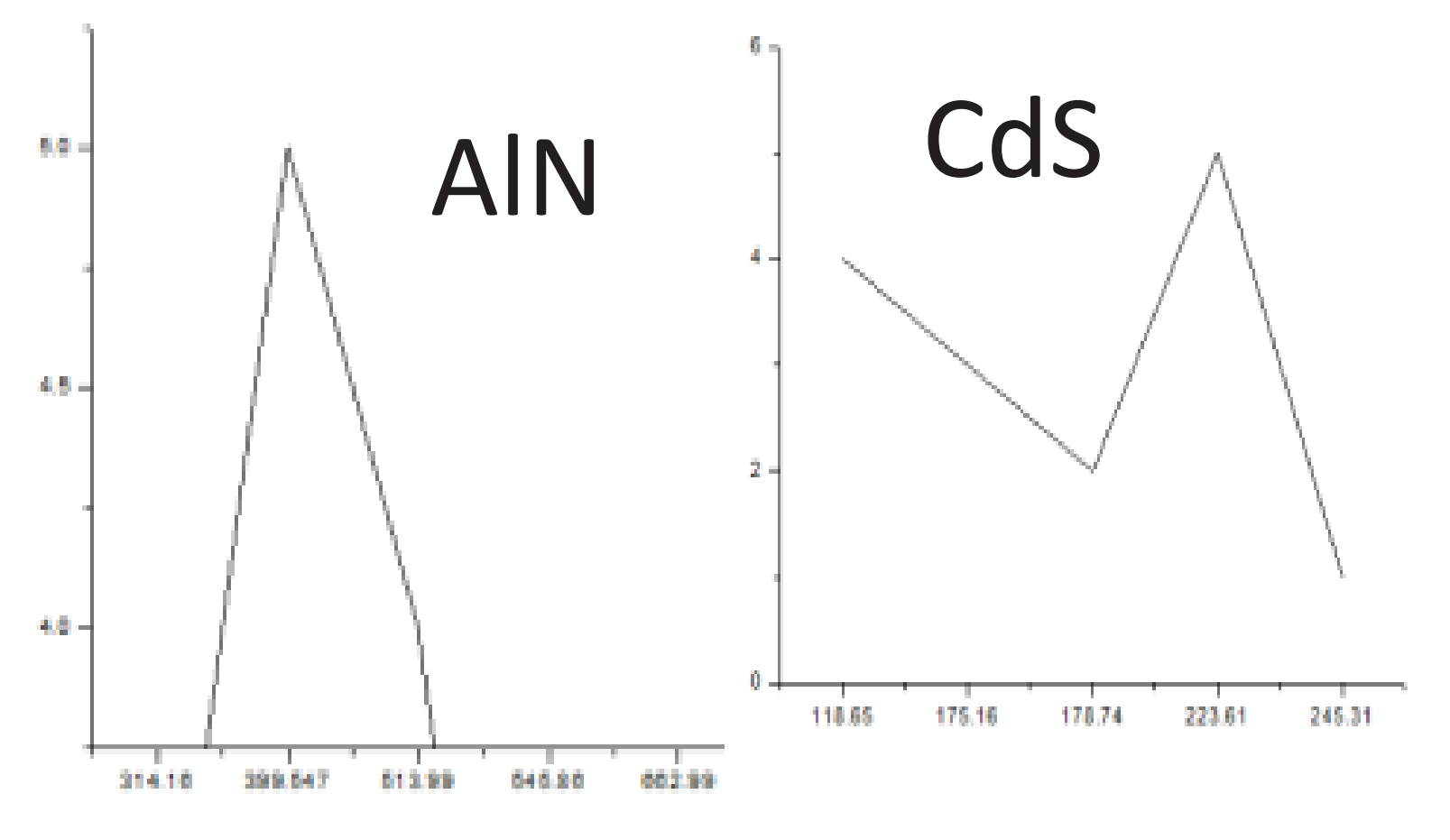
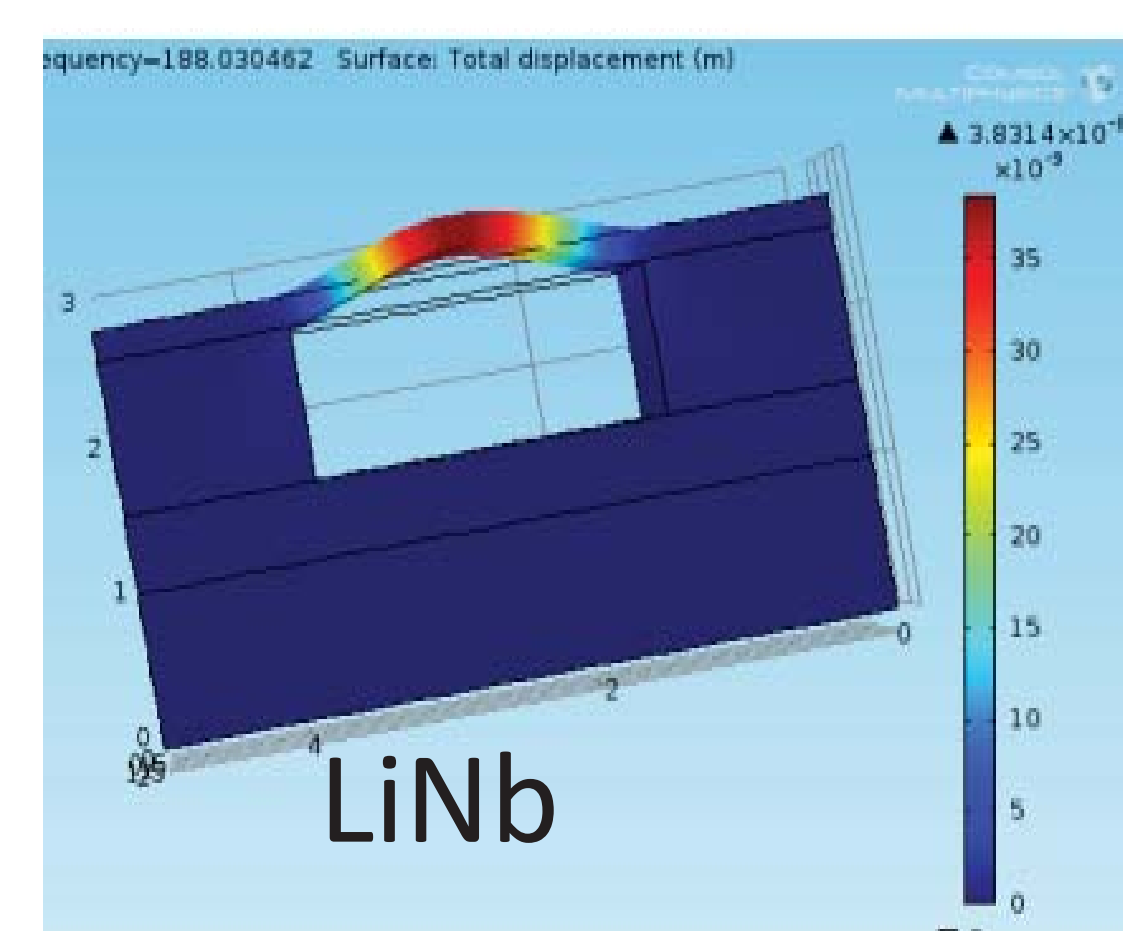
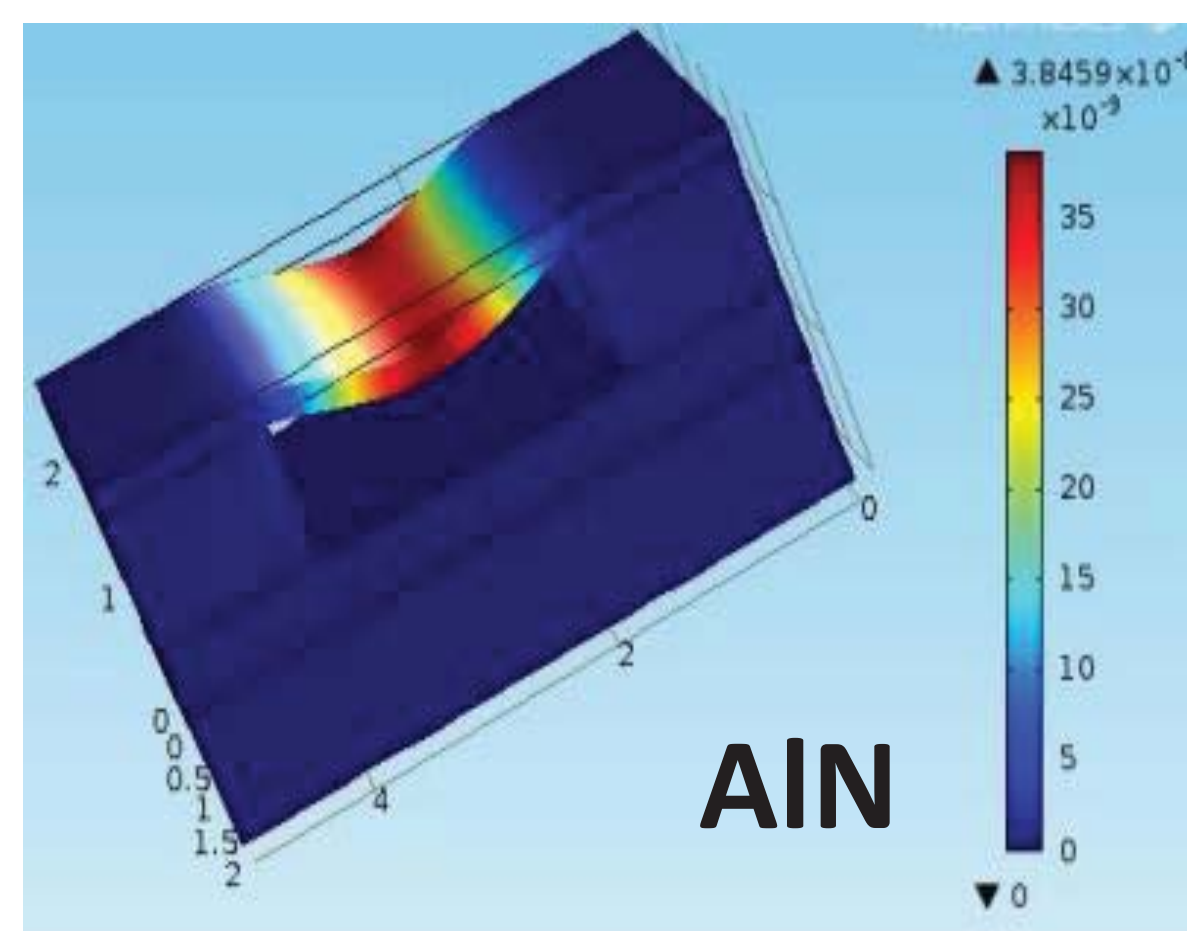


## Basic Equations involved for our study:

$$\lambda = d, \quad c = \lambda / f, \quad Q = f / \Delta f$$



## Results:



## Conclusion

Displacement vs Eigen freq. at point-9

The curves Q.F vs freq. shows that there are 2 resonant freq. for 2 different ranges of freq. From Power dissipation vs freq. curve, the power dissipation is almost 0. Between 520 Hz to 550 Hz. From the Q.F & Power dissipation curves it is desirable to operate From the Q.F & Power dissipation curve (Fig. 4.33), more power is lost below 400 Hz. If energy storing is not required in our application, then the freq. between 520 Hz to 550 Hz should be considered. If energy storage required with less power loss, then freq. range 410 Hz to 510 Hz should be considered.

Again from above simulation result the oscillation occurred on surface of piezoelectric material. The generation of SAW wave using AlN, LiNb, ZnO are different.

## References

- [1] R. Weigel, et al., "Microwave acoustic materials, devices and applications," IEEE Transactions on microwave theory and techniques, vol. 50, pp. 738-749, 2002.
- [2] H. Taylor, S. Y. No, "Medical robotics", Handbook of Industrial Robotics, pp.1213 - 1230 1999 :Wiley