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## Testing of Thermally Actuated Rotational MEMS Mirror

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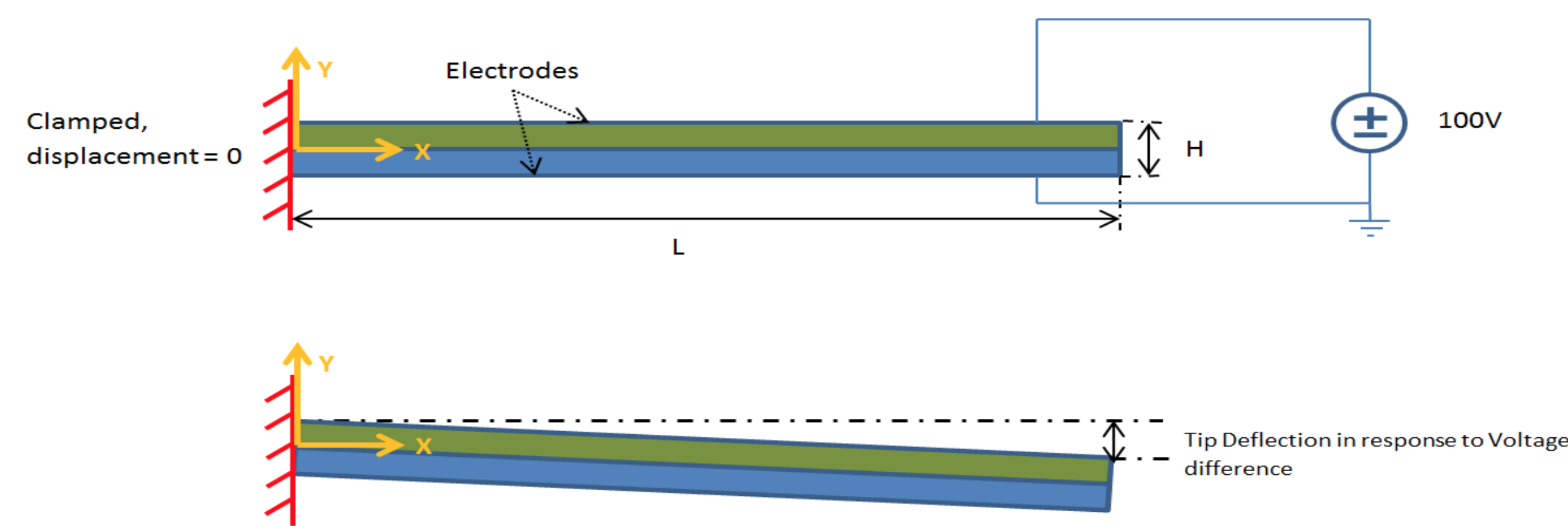
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## Introduction

A micro-electromechanical systems (MEMS) device contain both electrical and mechanical components that are in many common consumer products. Thermal micro actuators are standard components in micro systems and they are powered electrically. The thermal micro actuator shown below consist of material with different coefficients of thermal expansion. When the temperature of the micro actuator goes up due electrical power, the micro actuator changes shape due to difference in the expansion associated with temperature change.



## Objective

- To simulate and verify the response of the Thermally Actuated Rotational MEMS Mirror
- To generate reports and make observations based on the simulated results
- Draw comparison between actual and simulated results

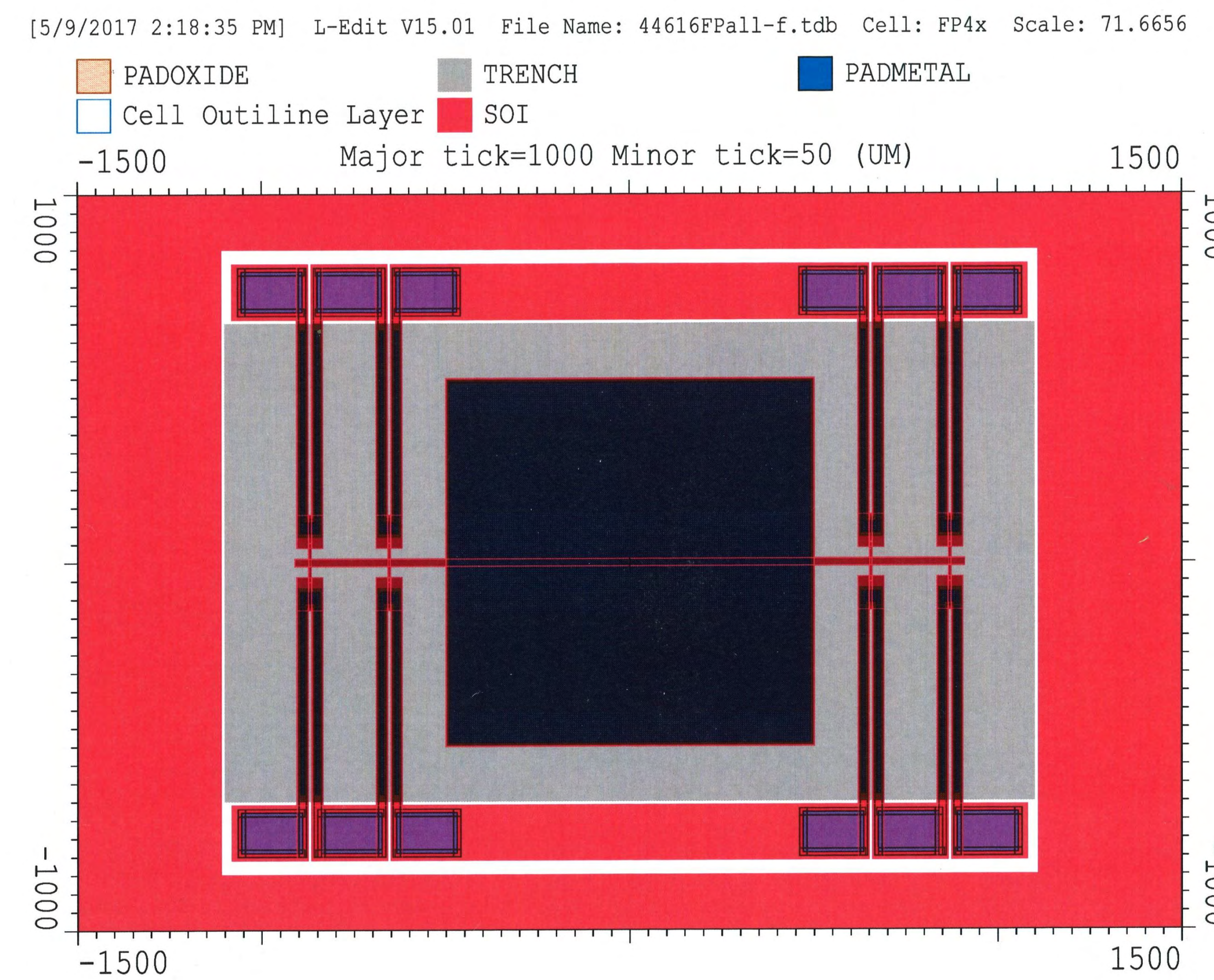


Figure 1: MEMS L-Edit image

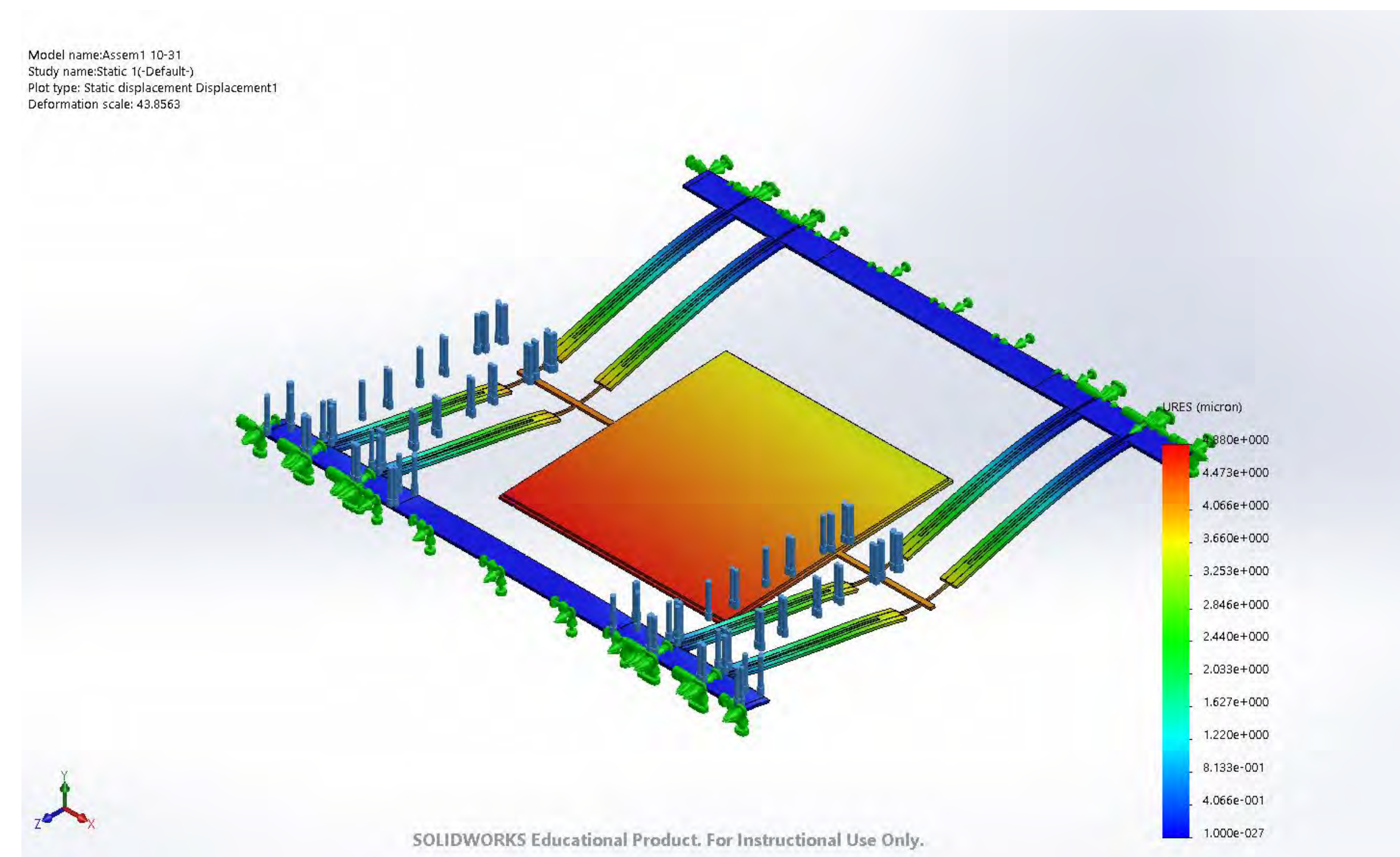


Figure 2: Solidworks simulation at 400 deg.C

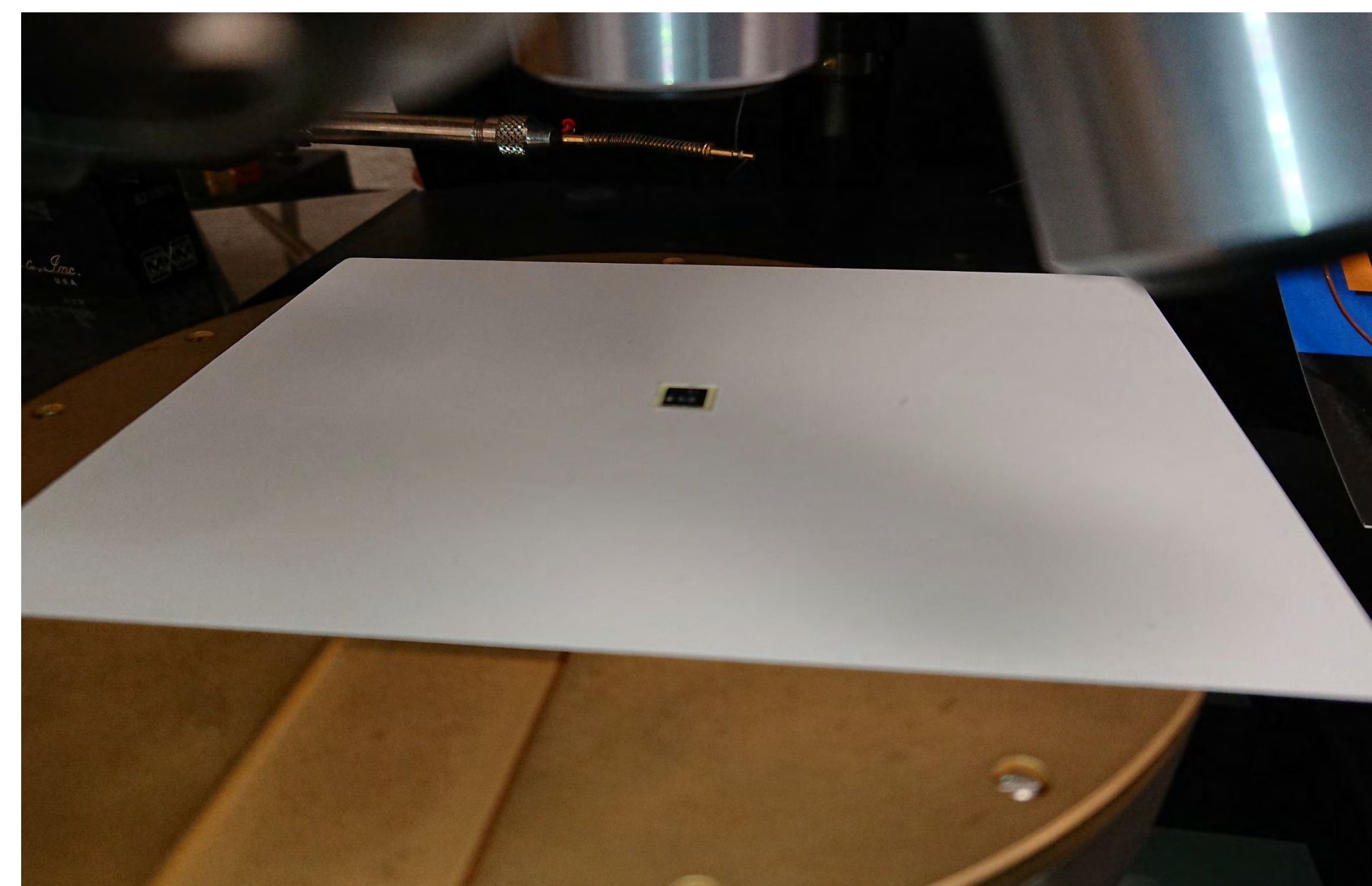


Figure 3: Fabricated chip

## Design

The device was first designed using L-Edit software. Using the L-Edit file, the MEMS chip was fabricated. This L-Edit design was used to test the finish product. However, before testing the fabricated chip, Solidworks software was used to do simulations based on various temperature environments and data was collected. Actual calculations were done using Excel to provide rough estimates of its intended functionality. Based on the results, the actual MEMS chip was tested.

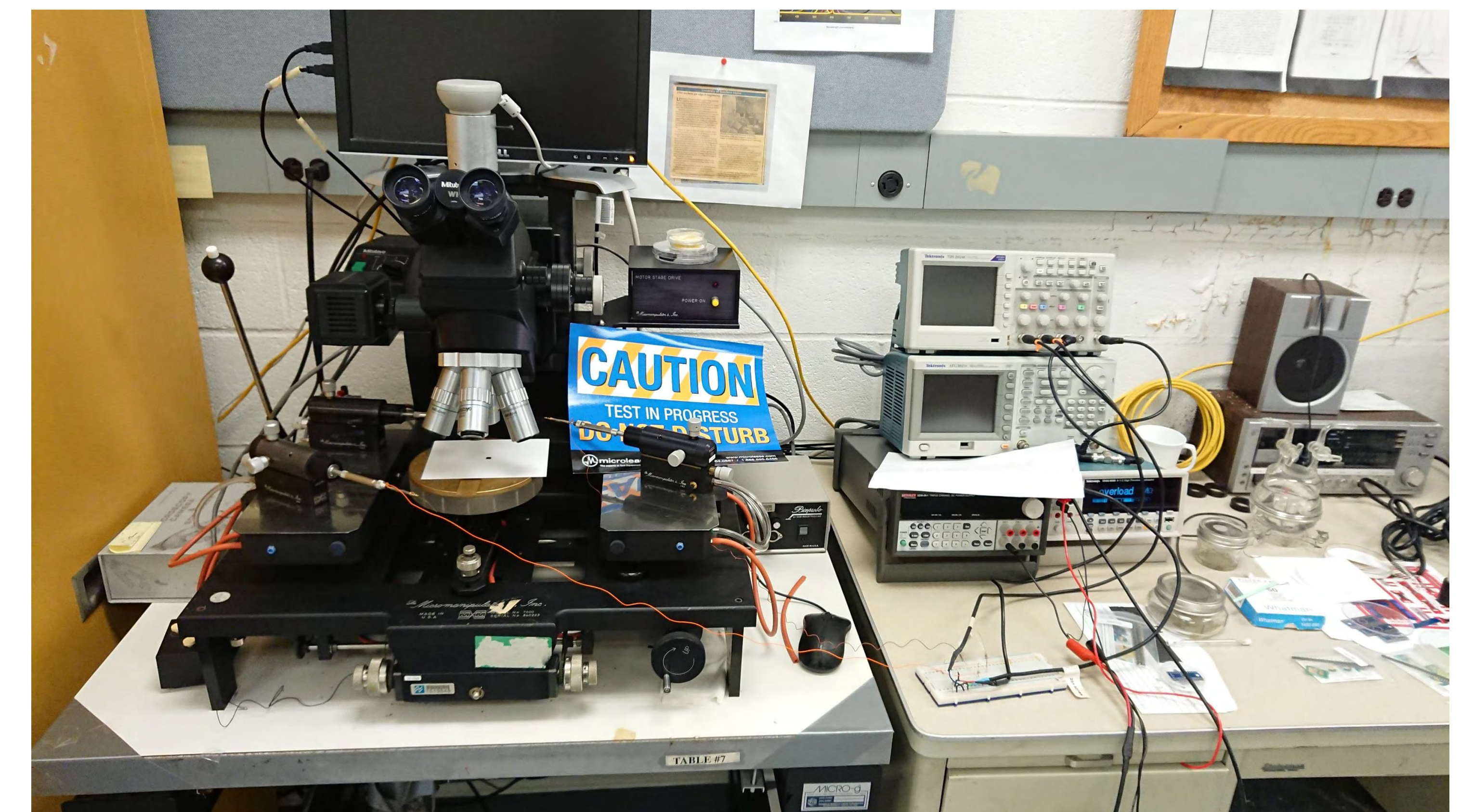


Figure 4: Setup of MEMS chip

## Conclusion

The overall results generated from the simulation correlate well with the obtained data & figures from the fabricated MEMS chip.

## Acknowledgements

Dr. Guvench, Chad Seeley, Joshua Wiswell & Seth Percy