

## About your research plan

### ▪ Manufacturing

Item 1 : Firstly I would understand the configuration of thickness about previous EAP film. The thickness is the same as previous work: around 70um (acrylic film is stretched by 300 X 300 %)

### ▪ Design Configuration

Item 1 : Cyclic force testing

I will give you these data of multiple-layer EAP in 1-2 weeks. You can find adequate data in Sanjay's papers.

My interests are getting the data about

- range of stiffness
- hysteresis according to motion frequency
- cyclic durability
- endurable force

> I am planning to build a simple platform for testing cyclic durability.

when pre-strain, material of electrode, configuration(planer/diaphragm etc)

Item 2: I understand simplifying problem make us to reach solution faster and faster.

However we should be careful not to over-simplify it.

Is there slightly difference between EAP with electrode and EAP without it?

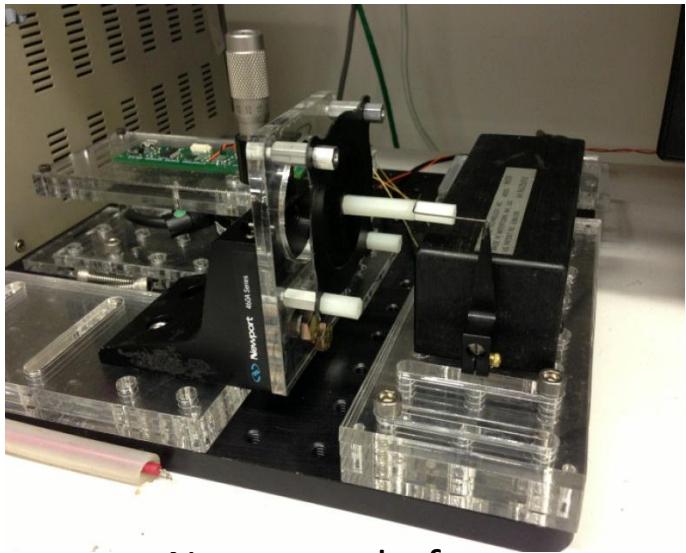
Unless we need to test the properties of EAP when actuated, or there is almost no difference. It is because:

- 1) The overall stiffness is contributed mainly by acrylic film which is tightly stretched and thicker than coated electrode.
- 2) The hysteresis is caused by viscoelasticity of acrylic film and has nothing to do with the electrode.

Therefore, by building the rotary EAP without electrode we can at least get these insights:

- 1) Investigation of the fabrication procedure, how to make a better rotary design. Currently many problems found and will be solved in the next iteration.
- 2) After a robust rotary design is built, the rough scale of stiffness can be tested.
- 3) The hysteresis property can be tested.

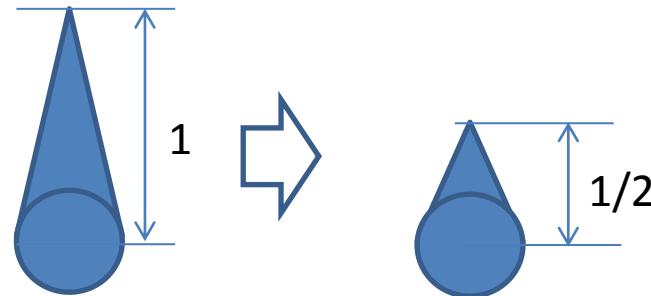
Feb13 - Feb19



New test platform

Suggestion:

If you want to get higher force, you change the Lever of 305B device.

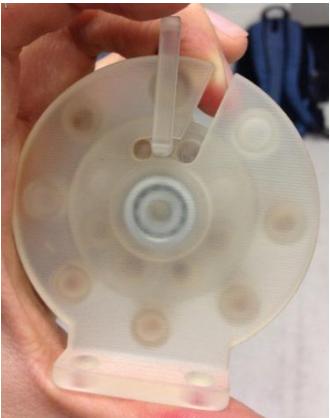


Max 5N force

Max 10N force

(reducing velocity and displacement)

Thank you for the advice. Rubber band is a good idea for testing the nonlinearity created by rotary design.  
Actually, I have made another basic geometrical model of this design for analysis.  
However, since rubber band don't have the same hysteresis as acrylic film, the hysteresis cannot be studied in this case.



Suggestion:

In addition to verify the attachment of EAP,  
Using normal rubber tube you can get the nonlinear  
character of stiffness transition from linear move.  
Getting data for linear stiffness of rubber tube is very easy.

