

# Interactive 3D Tangible Display with a High-Speed Stiffness-Variable Jamming Module

*"Transforming Static Art into Tactile Experience Through Magnetic Jamming"*

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## INTRODUCTION

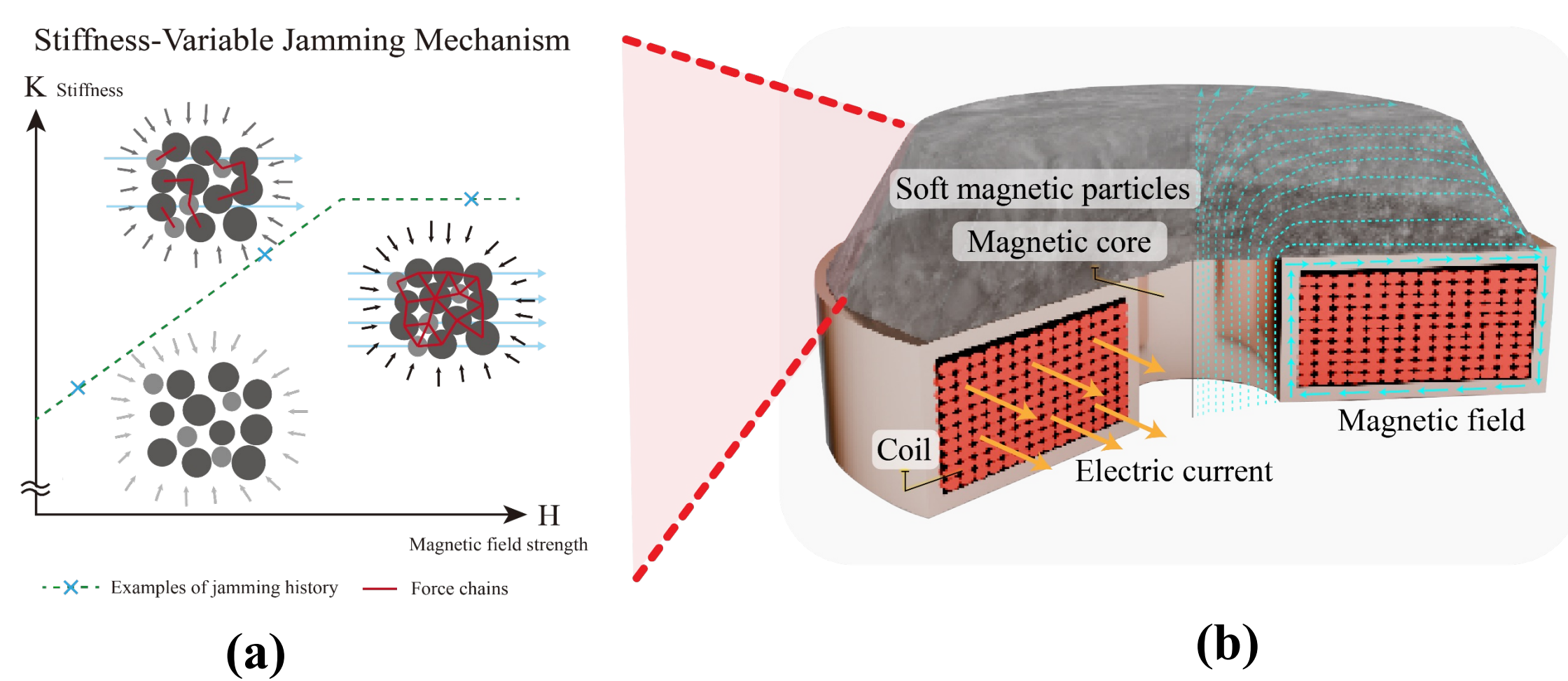
### Research Aim

- ✓ Transform conventional untouchable static art into interactive art by developing a **3D tangible display**.
- ✓ Using a **stiffness-variable surface** based on **magnetic jamming**, we provide a more immersive and tactile artistic experience.



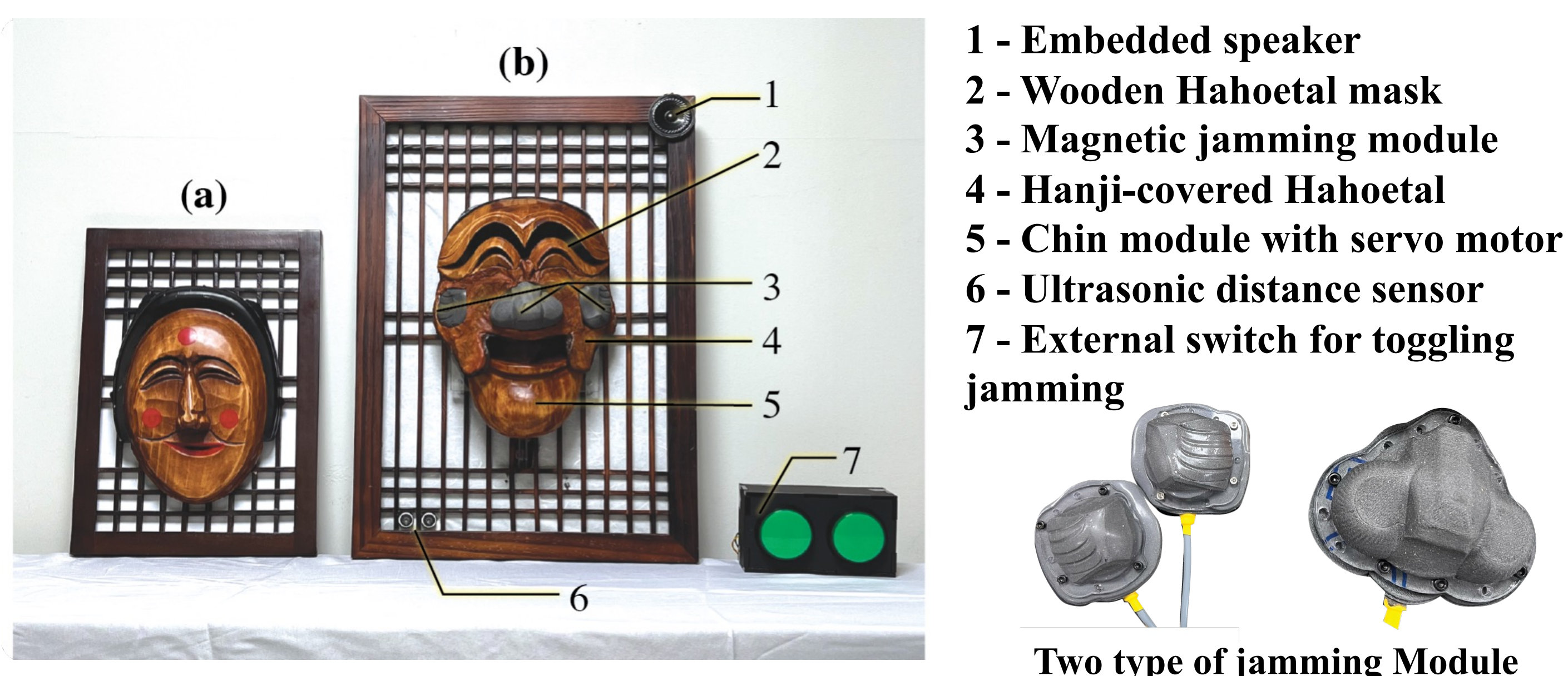
## CONCEPT AND DESIGN

### Working Principle of Magnetic Particle Jamming

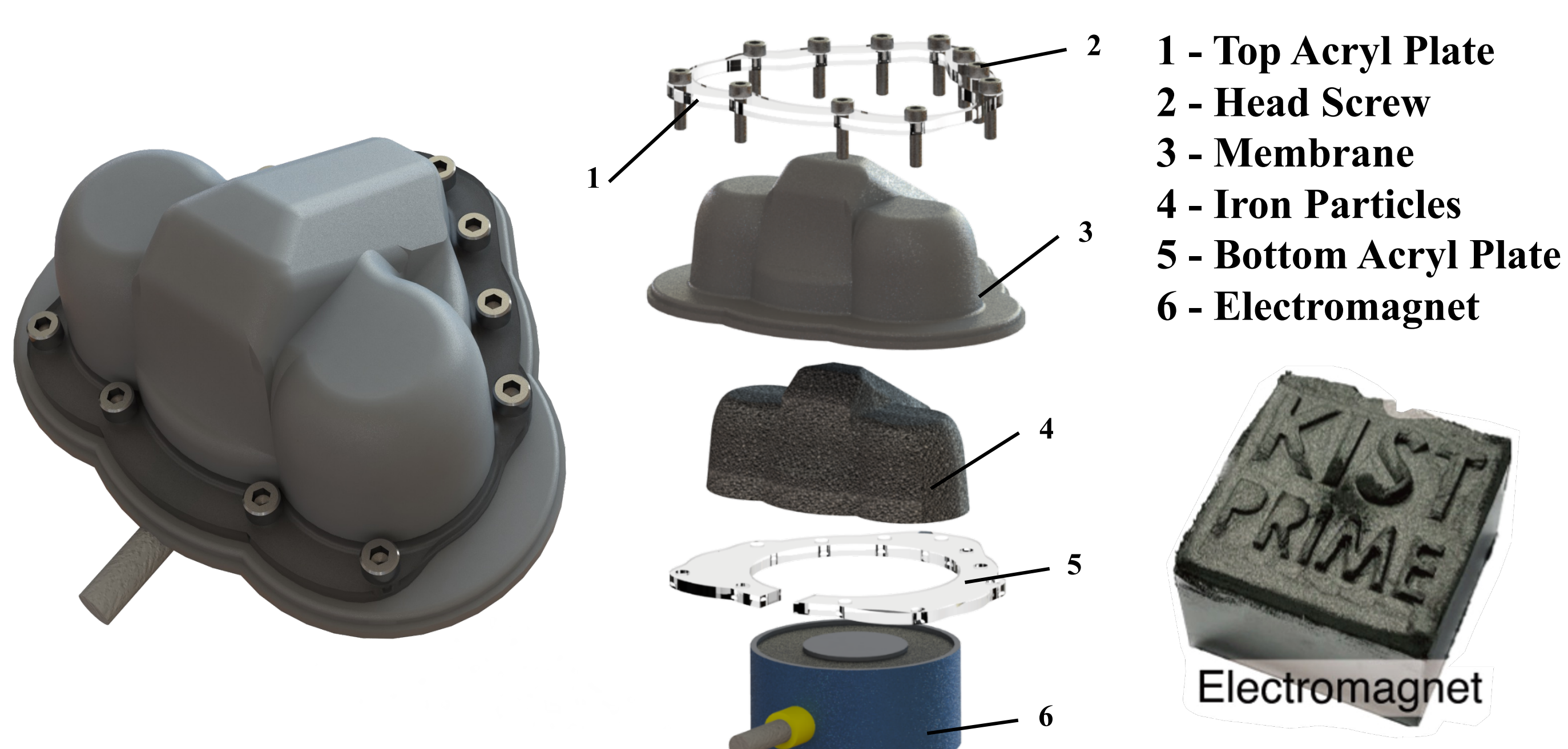


- ✓ When an electric current is applied to the electromagnet, it induces magnetic attraction among the soft magnetic particles, thereby increasing the stiffness and preserving the deformed shape.
- ✓ This mechanism is compact and lightweight, making it suitable for integration into traditional artworks without compromising their aesthetic value.

### Structural Configuration of Overall Artwork

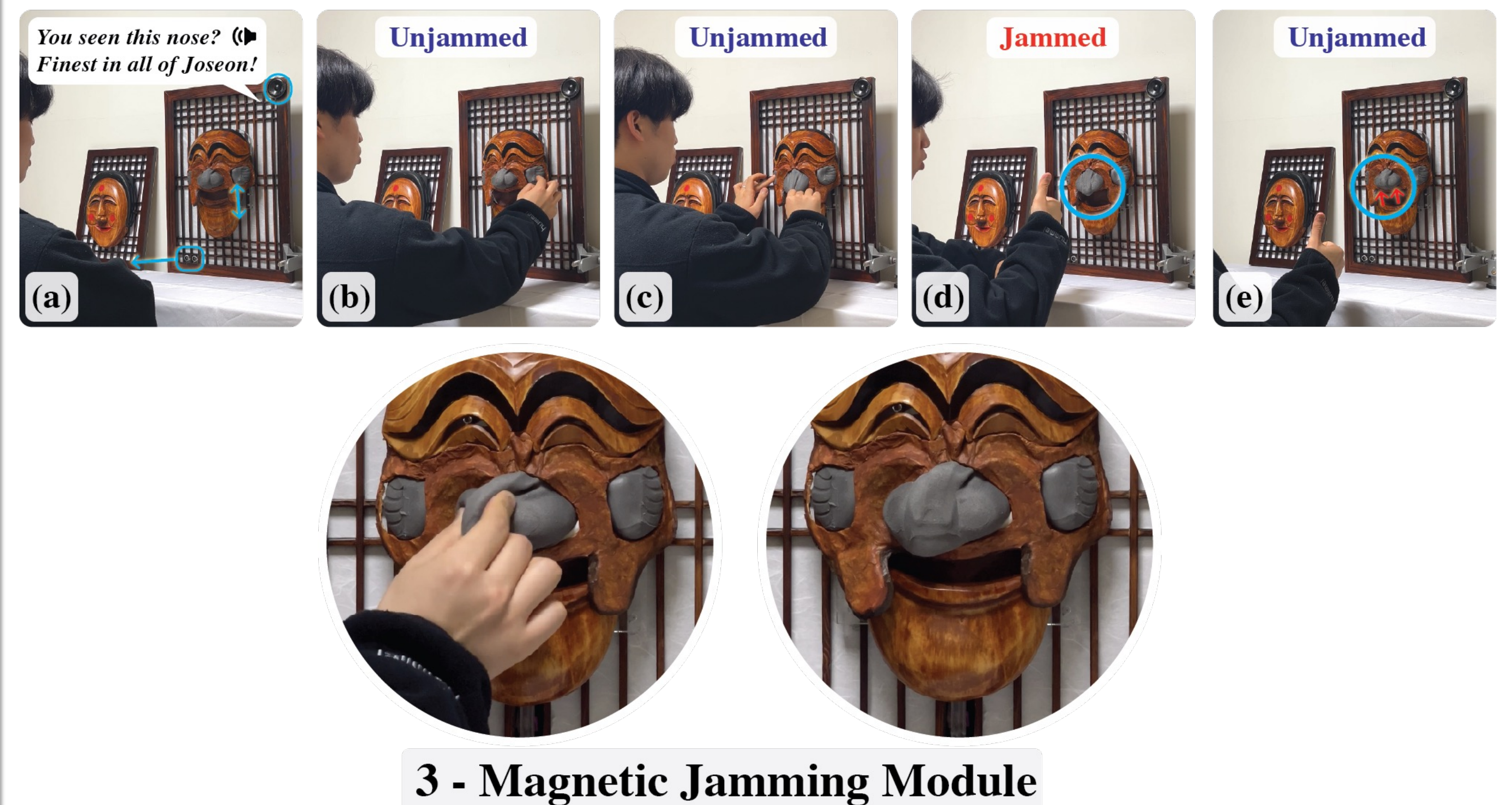


### Structural Configuration of Jamming Module

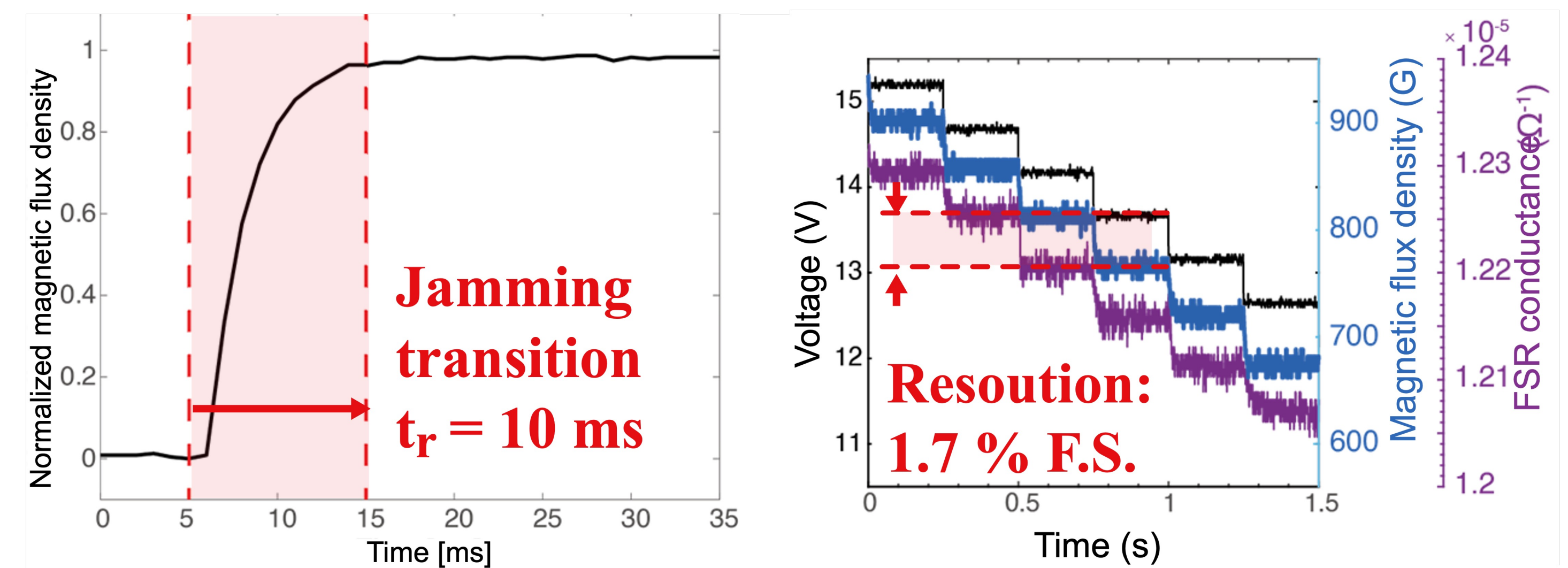


## EXPERIMENTAL EVALUATION

### Durability Under High-Payload Condition



### High Speed & High Resolution Jamming



### Customizing Jamming Module & Composition

(Unit: g)		Iron Granular	Iron Powder	Oil	Silicone
Nose	Membrane	-	15	-	25
	Particles	182	78	20	-
Cheek	Membrane	-	38.3	-	12.7
	Particles	38.5	38.3	3	-

### Korea Traditional Heritage



- ✓ These are traditional Korean *Hahoetal* masks from Andong, symbolizing various characters in folk performances. They are crafted using Hanji, traditional Korean paper made from mulberry trees.

## CONCLUSION

- ✓ We present a **stiffness-variable 3D tangible display** integrated with traditional Korean mask art.
- ✓ This fusion of art and technology enables **user interaction and real-time haptic feedback**, offering a new dimension in cultural appreciation.

## ACKNOWLEDGEMENT

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