

Tangibles on Interactive Surfaces

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Media Computing Group
RWTH Aachen University

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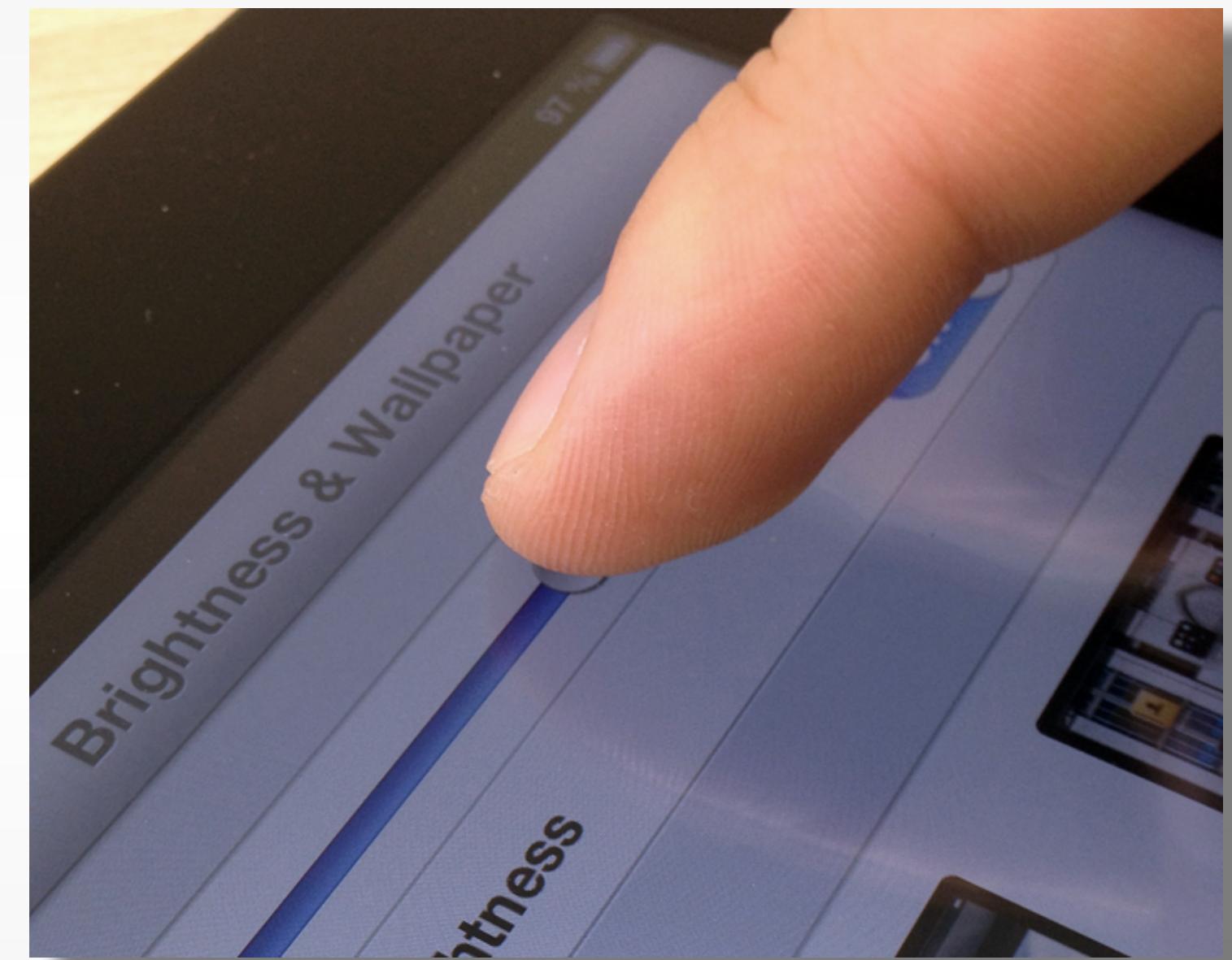
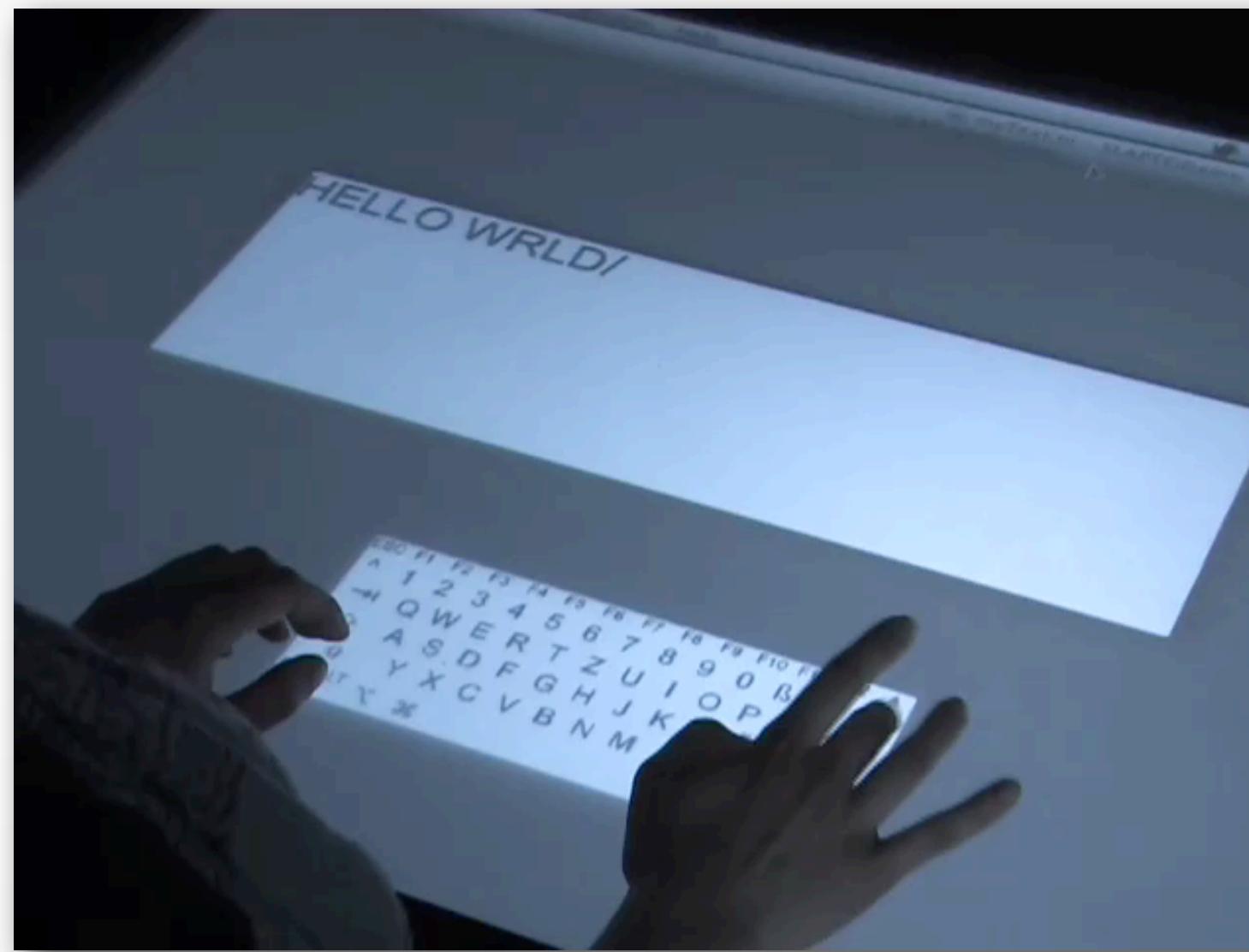
<http://hci.rwth-aachen.de/cthci>

In-class Exercise: Typing Eyes-Free

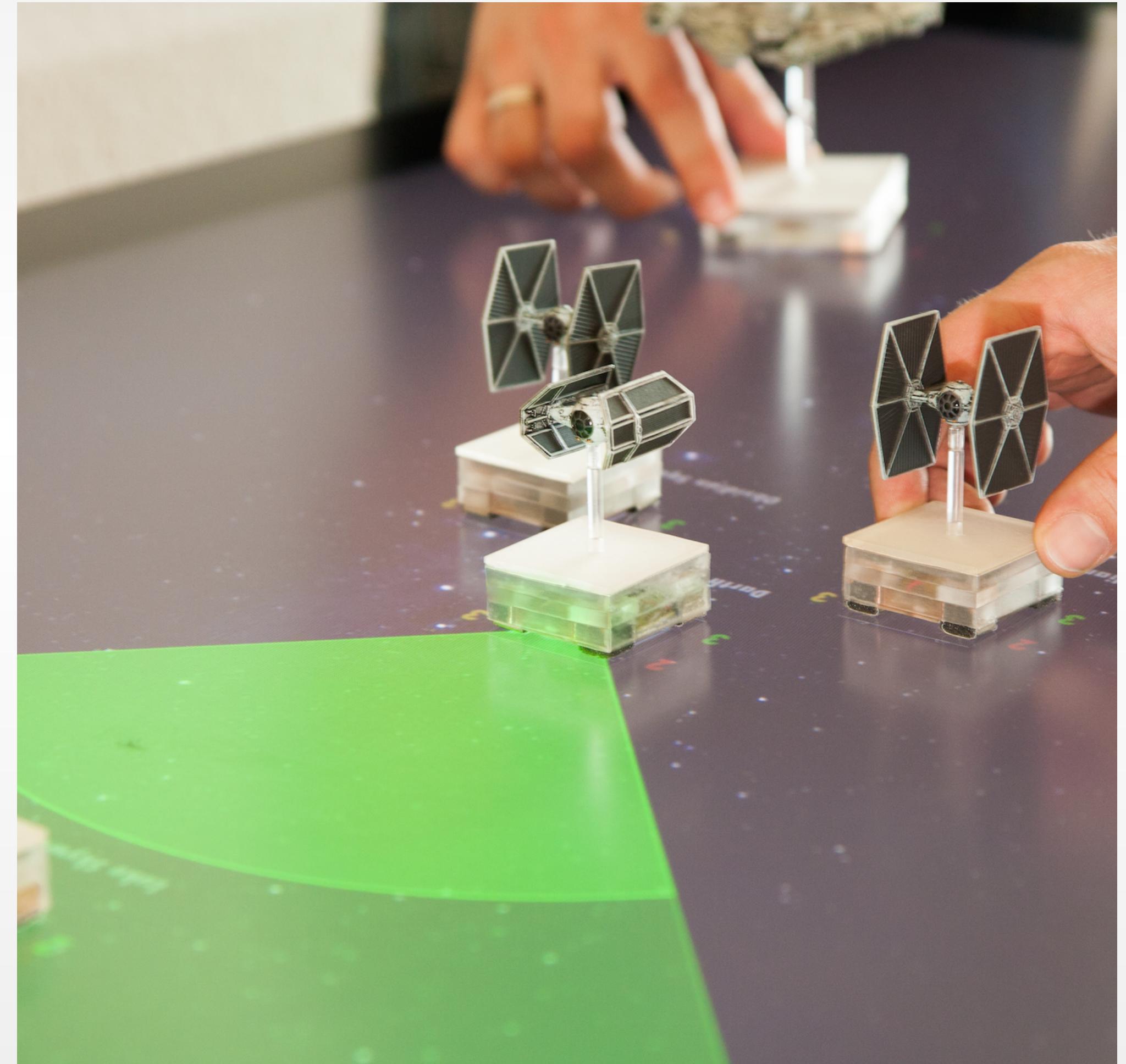
Try to type on your smartphone without looking at the screen.



Limited Haptic Feedback

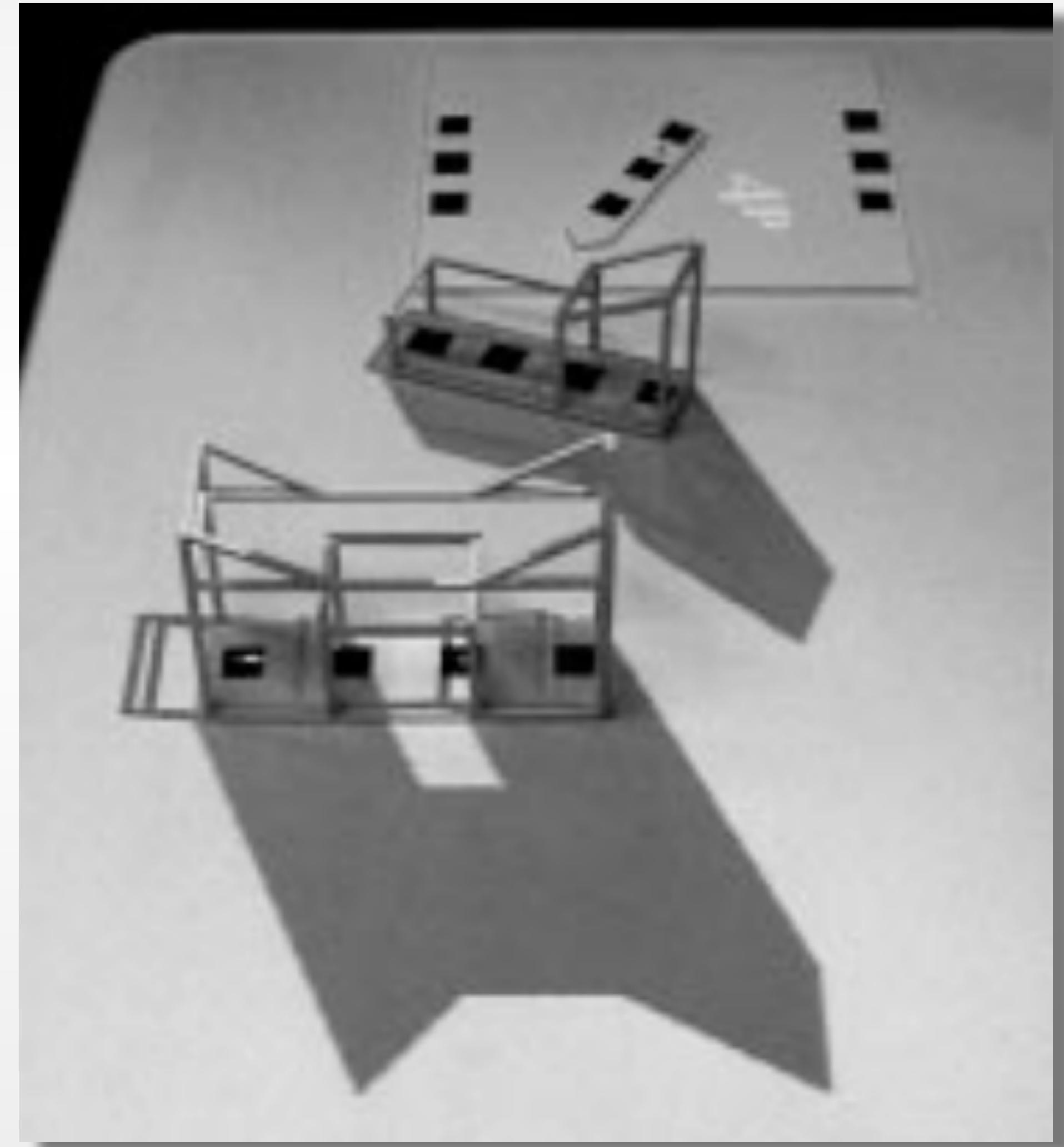


Tangibles on Interactive Surfaces



Tangible User Interfaces

- **Urp** Underkoffler, Ishii CHI' 99
 - Urban planing simulator



Tangible User Interfaces



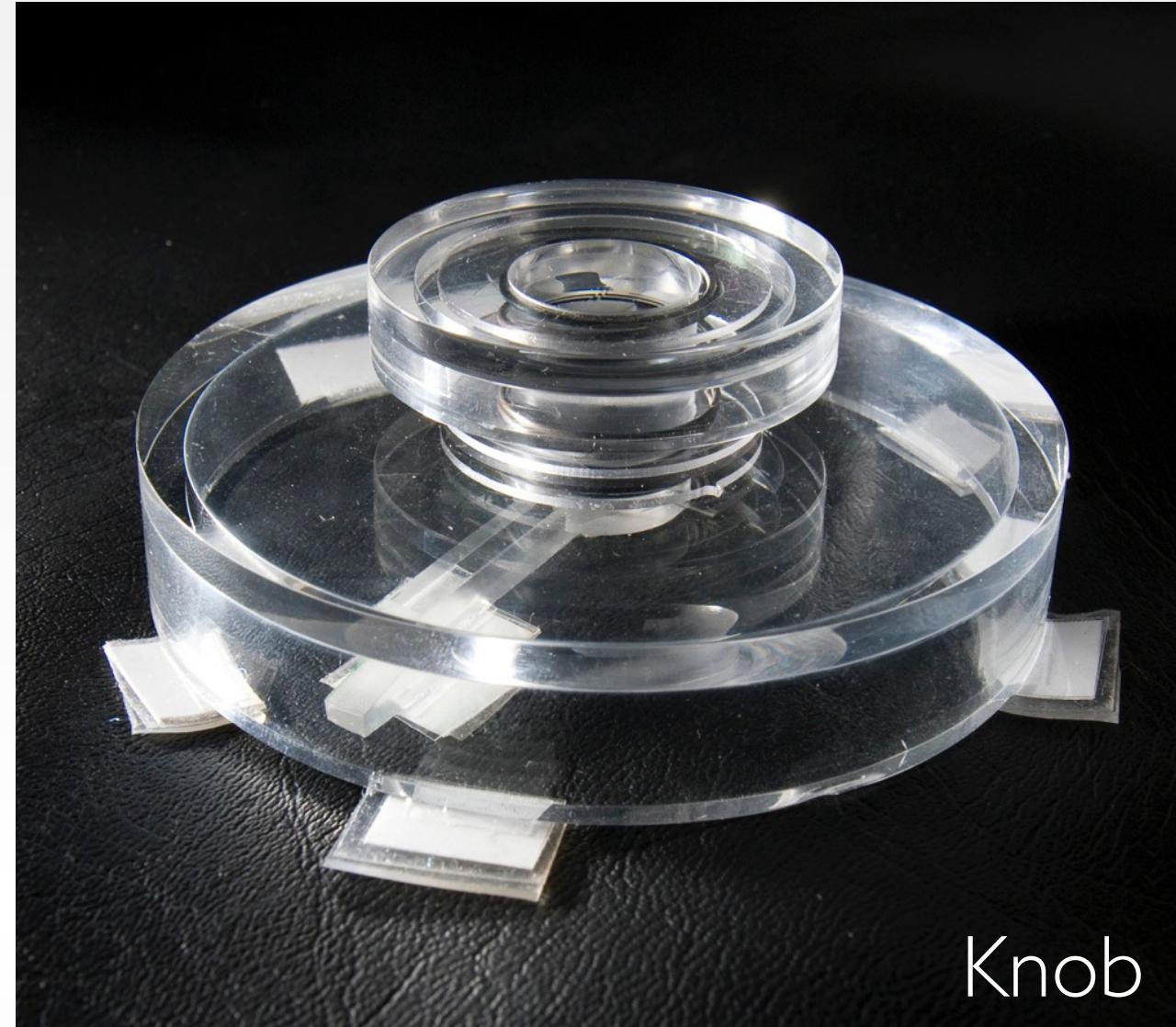
reacTable Jordà et al. TEI' 0



SLAP Widgets

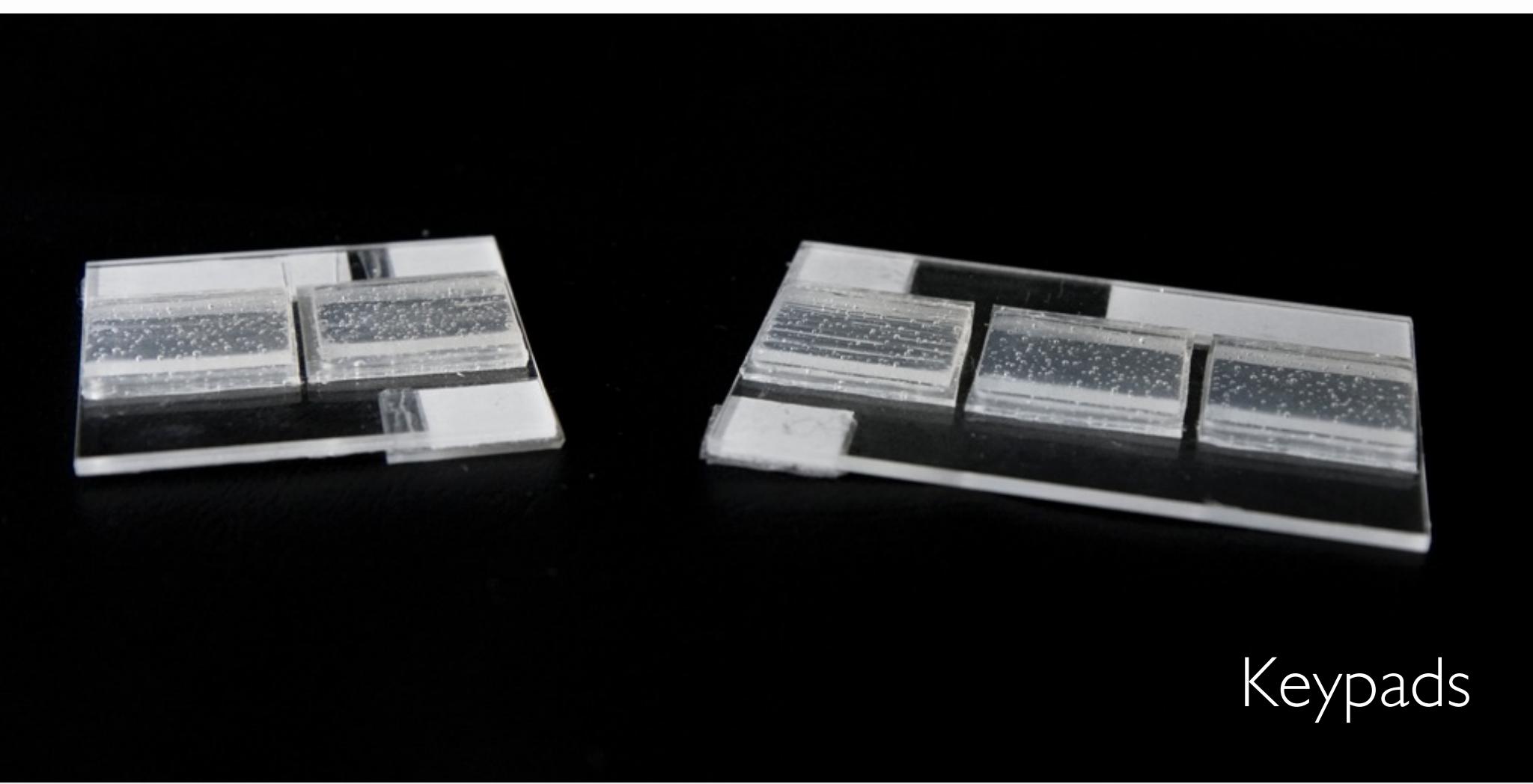


Keyboard

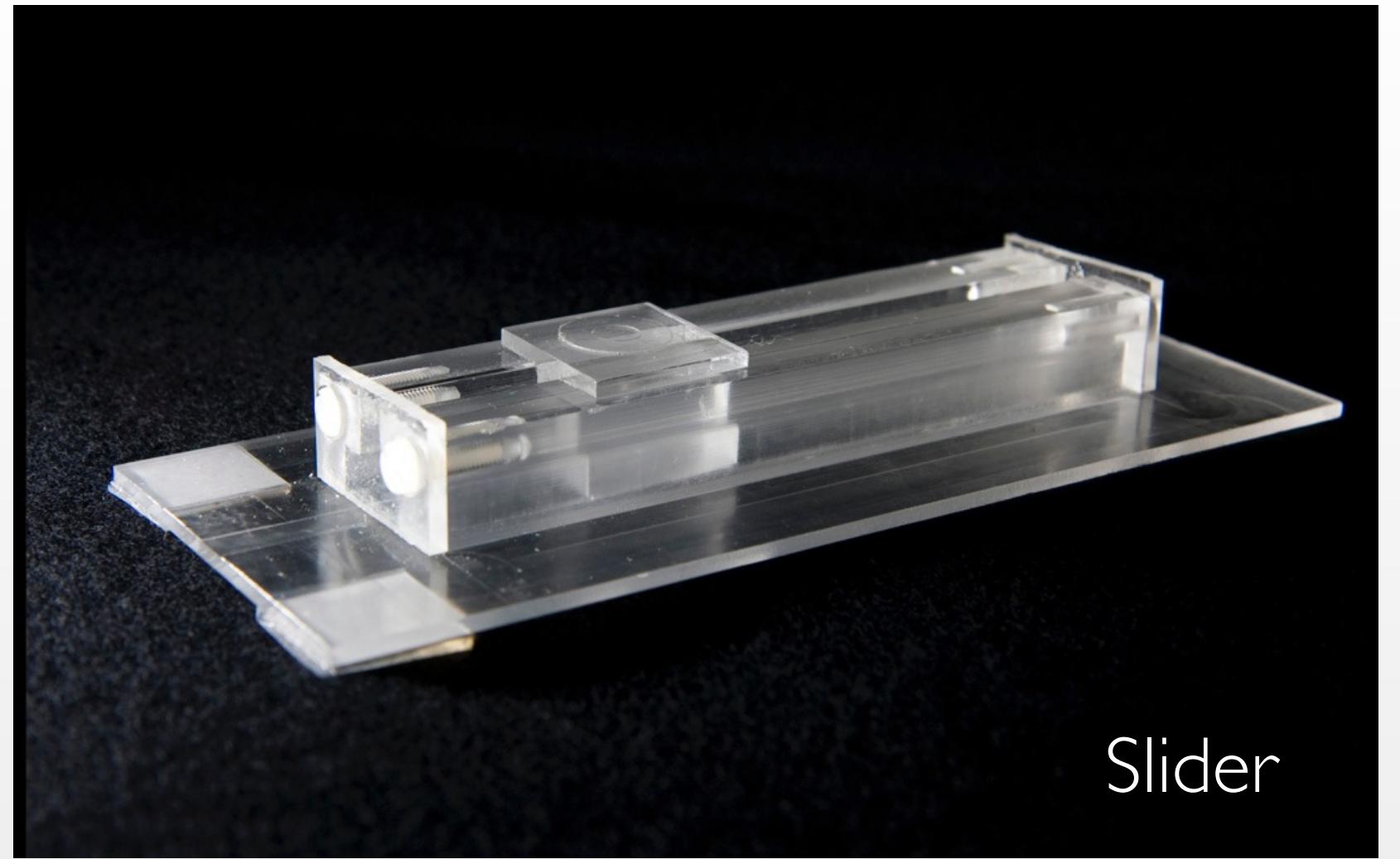


Knob

[Weiss et al. CHI '09]

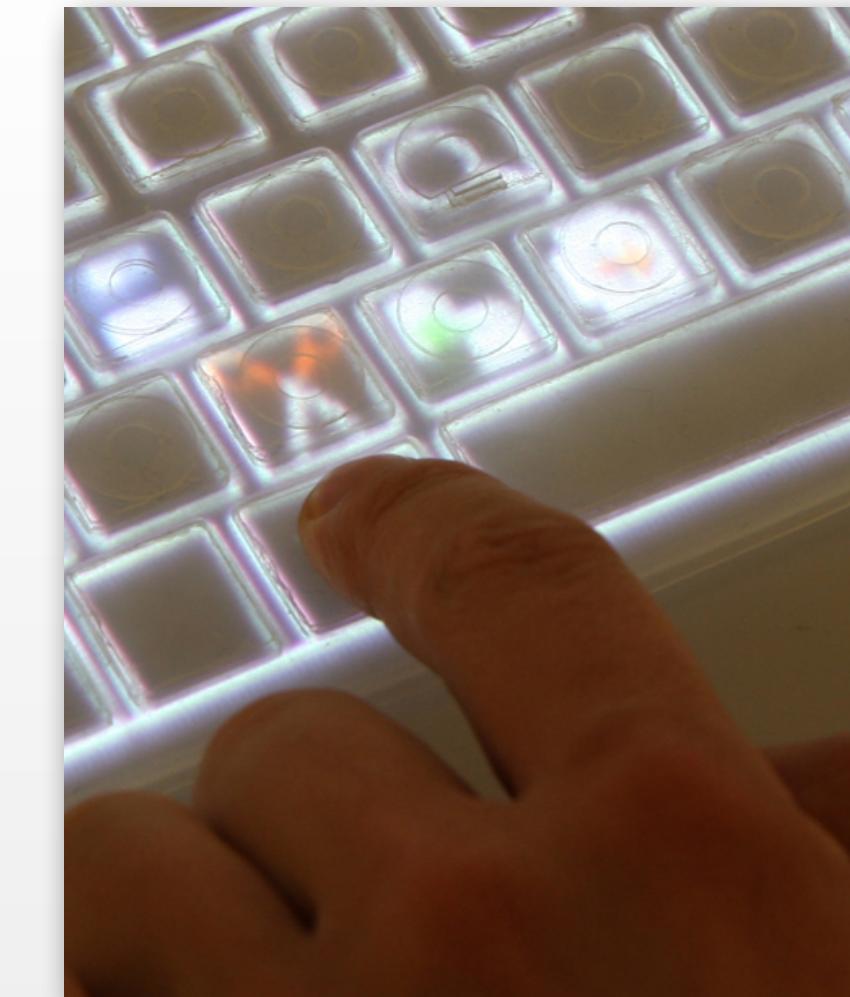
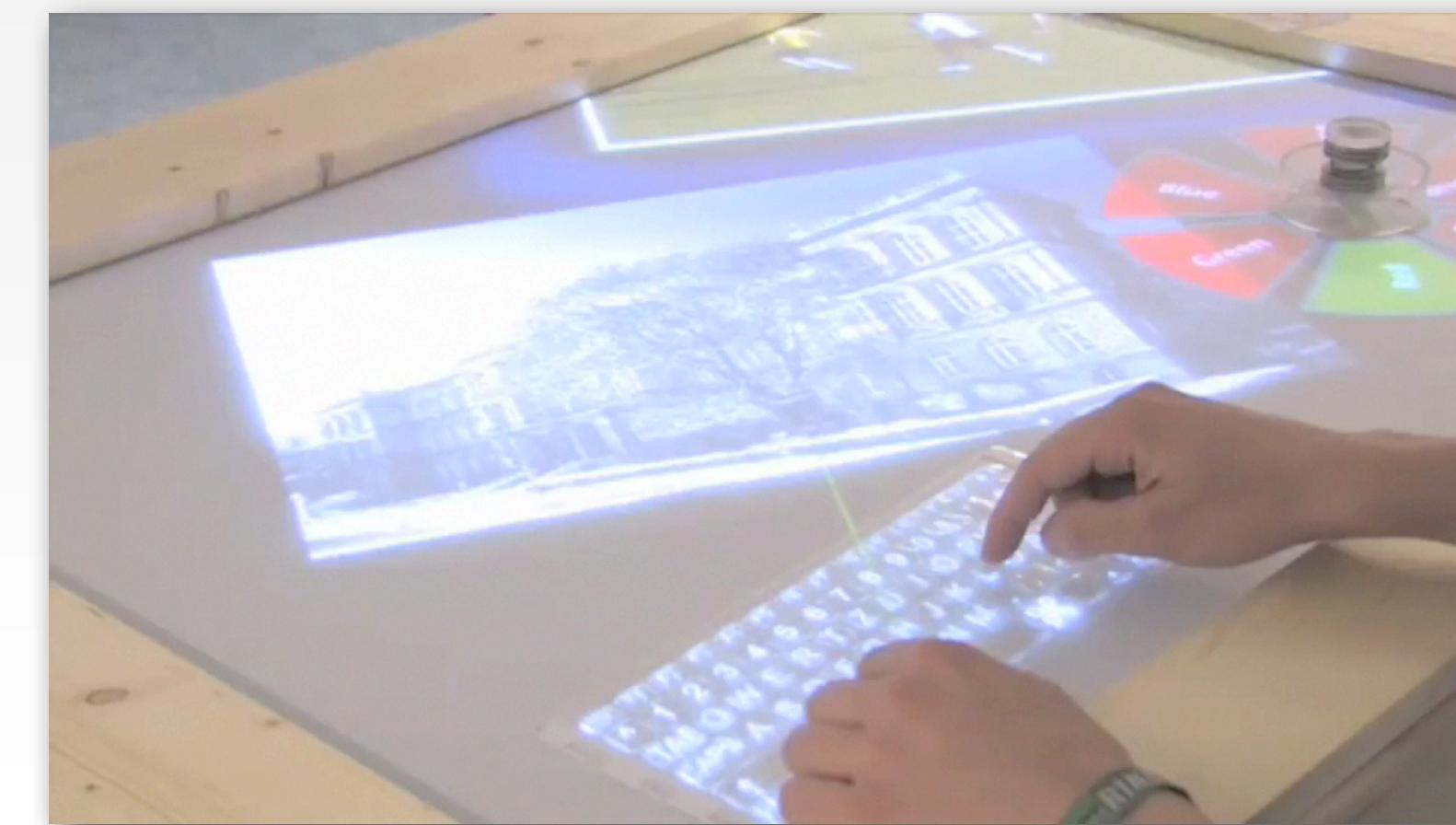


Keypads



Slider

SLAP Keyboard



SLAP Knob

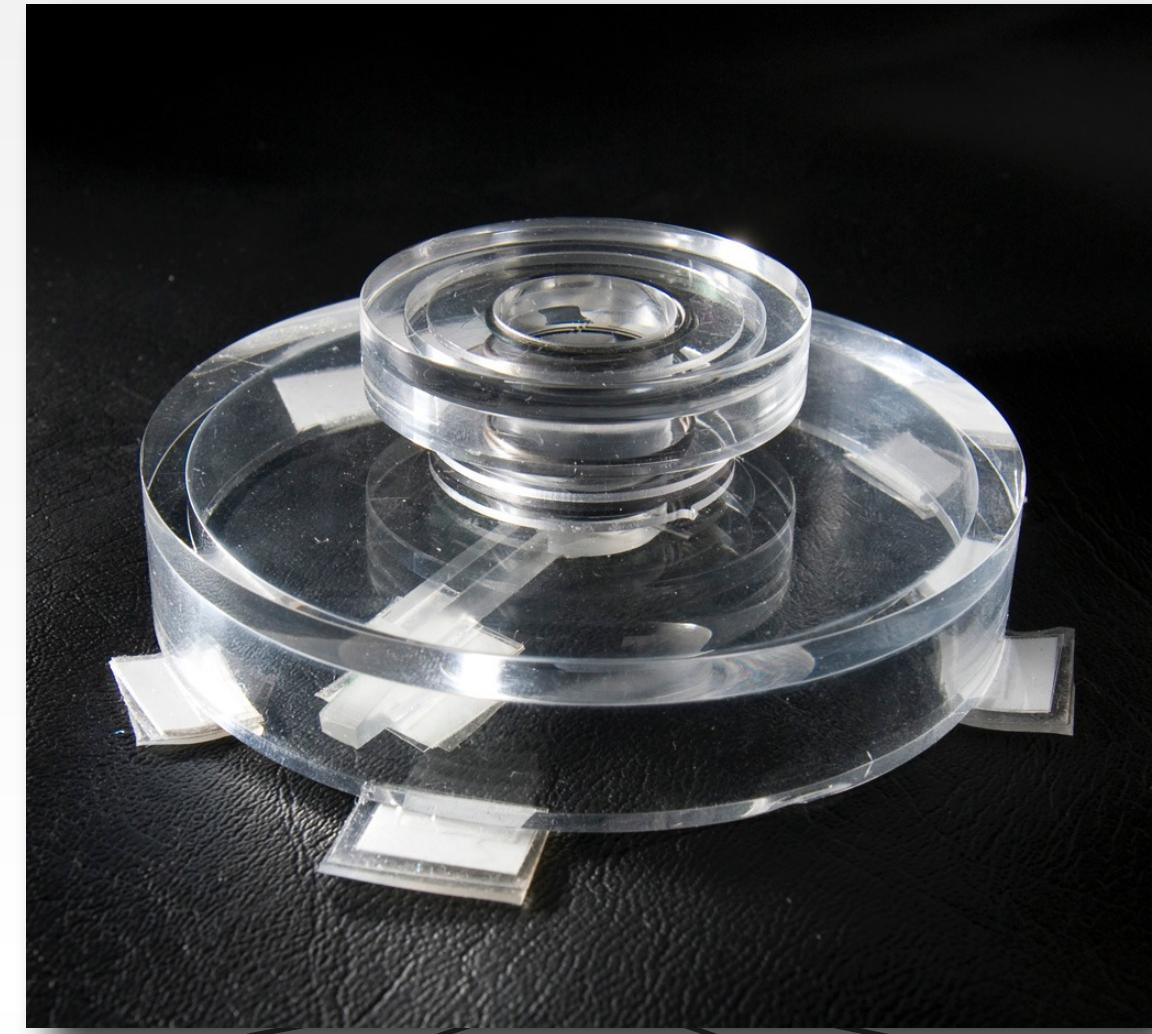


jog wheel mode



menu/value mode

SLAP Knob



value



jog wheel

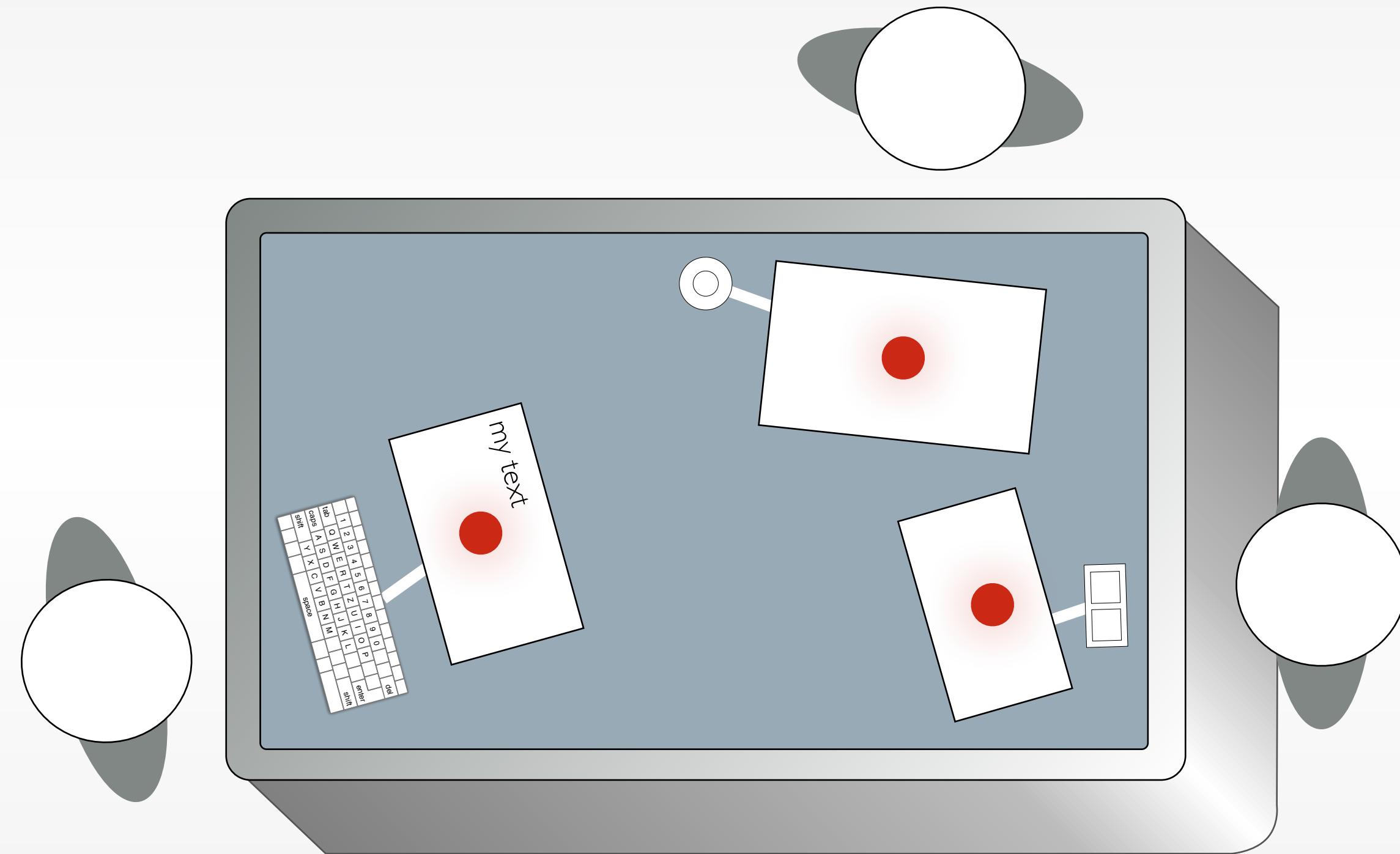


menu

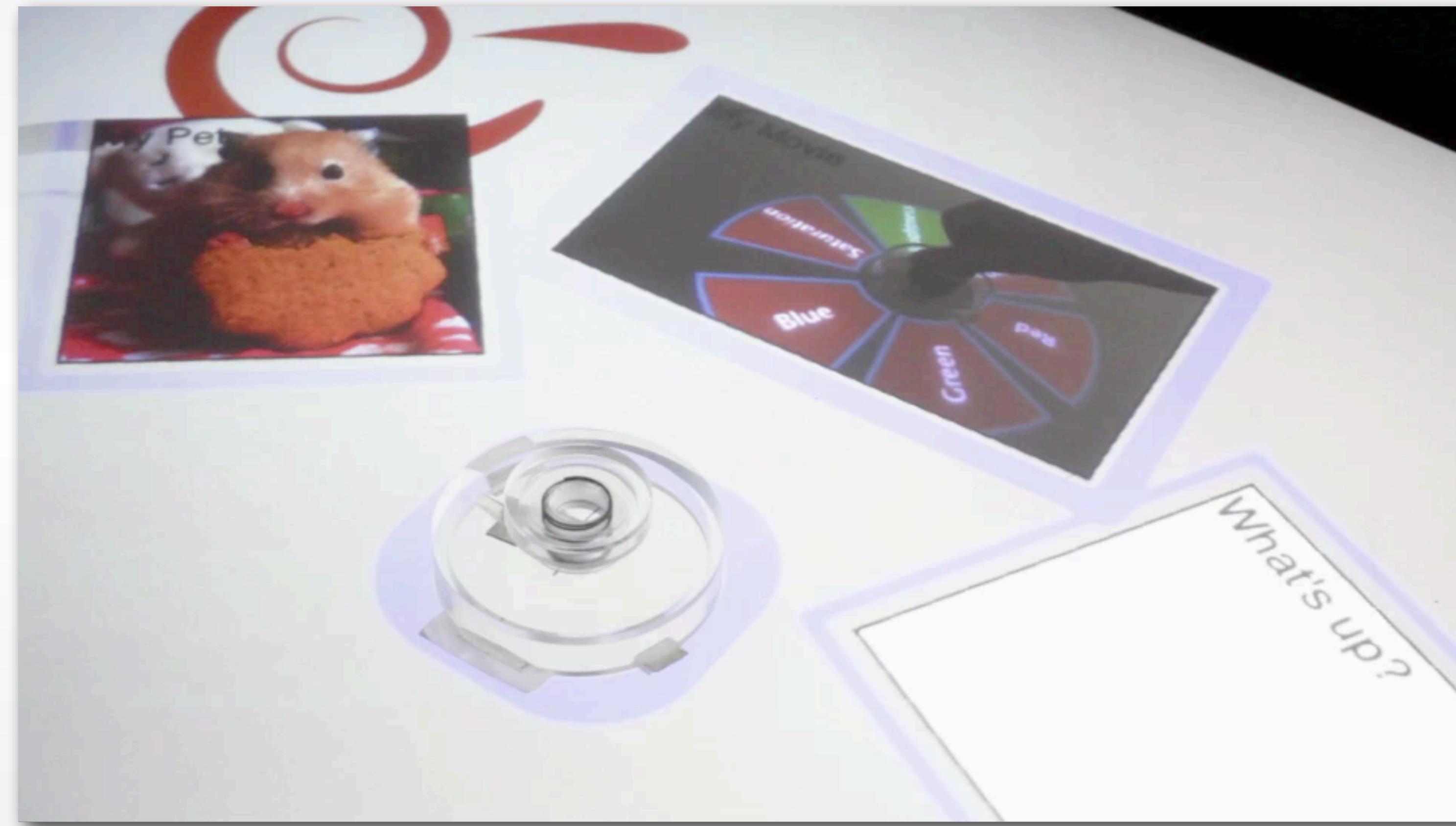


hue

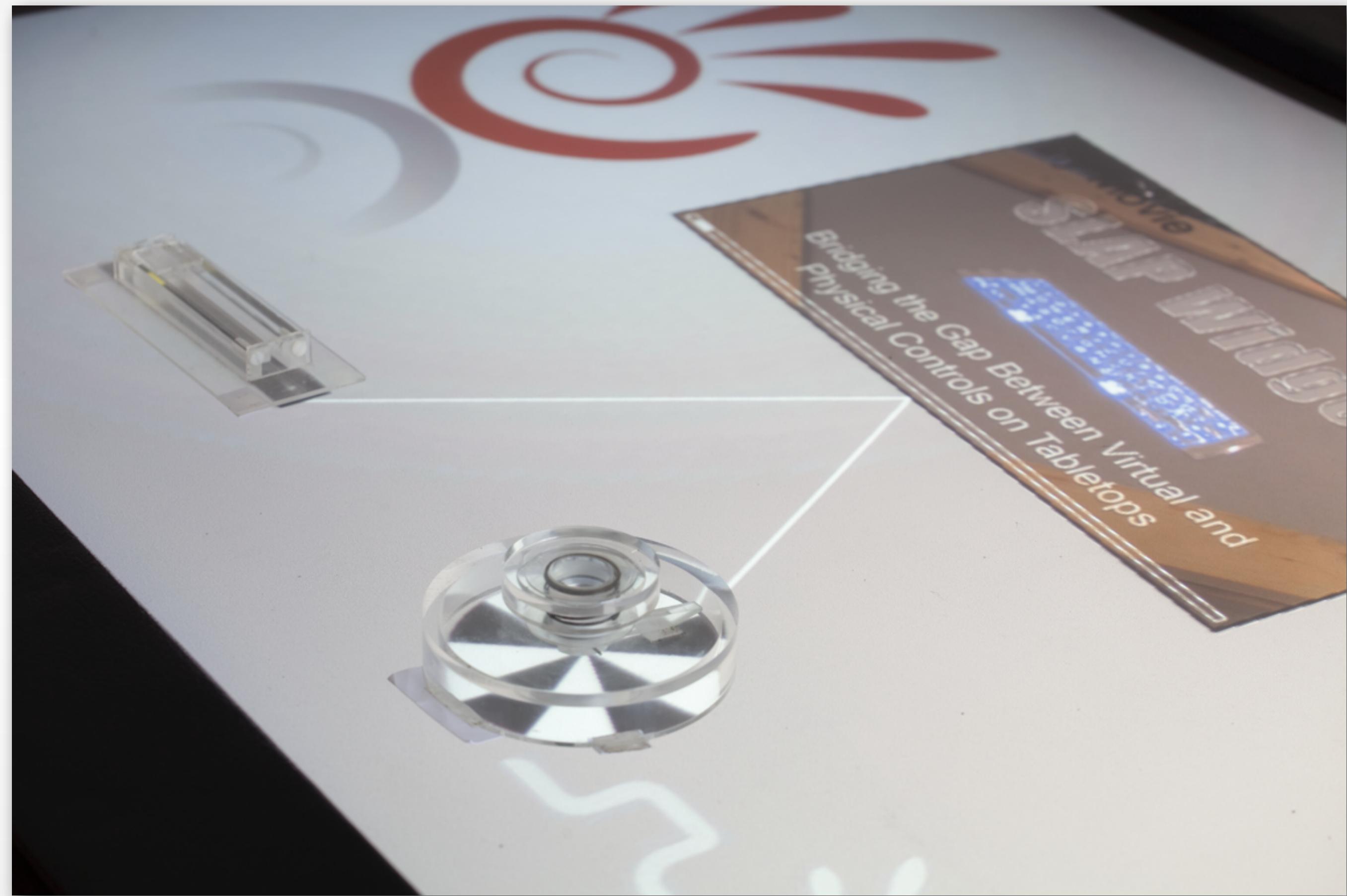
Multi-Focus Policy



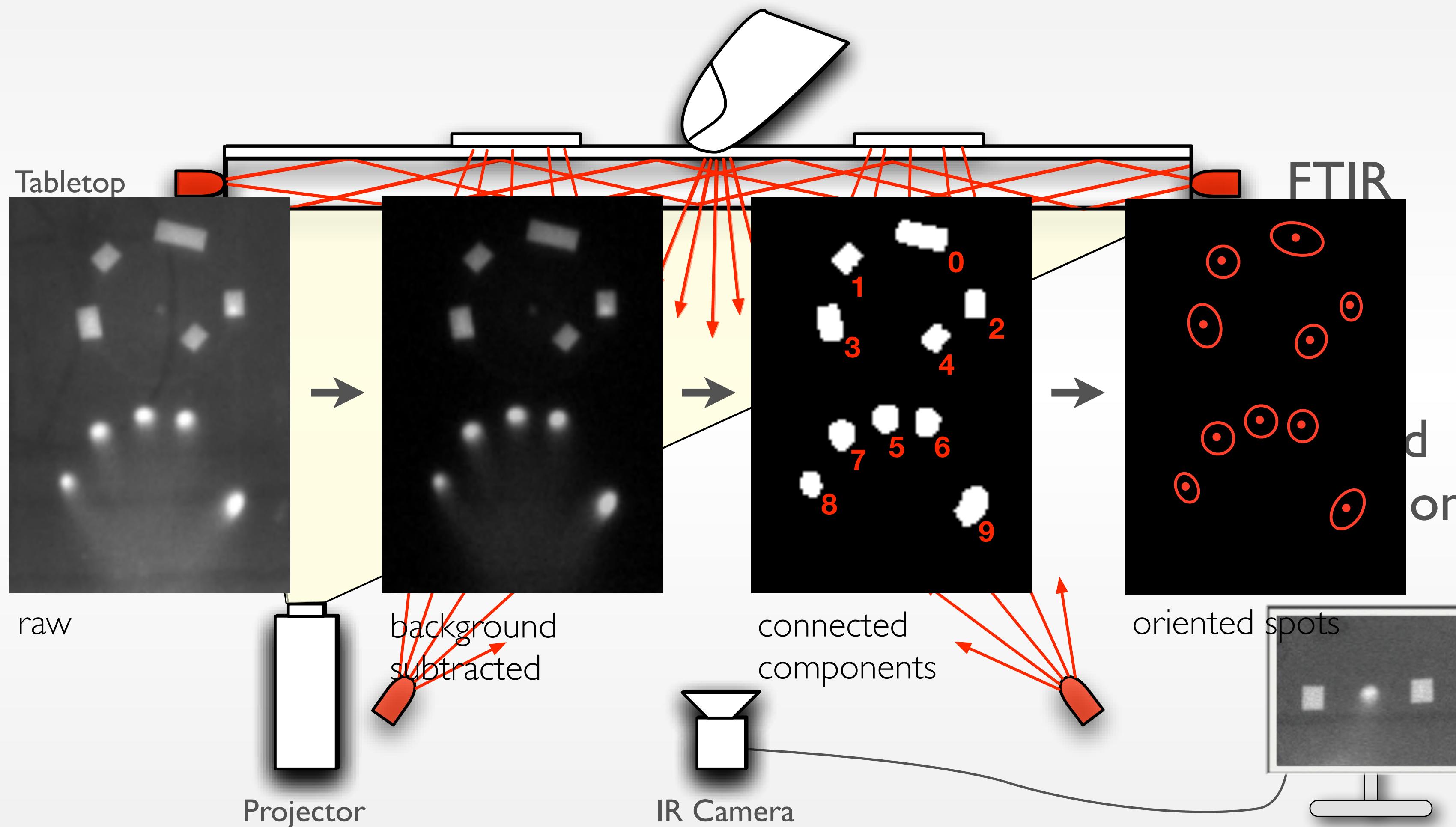
Pairing



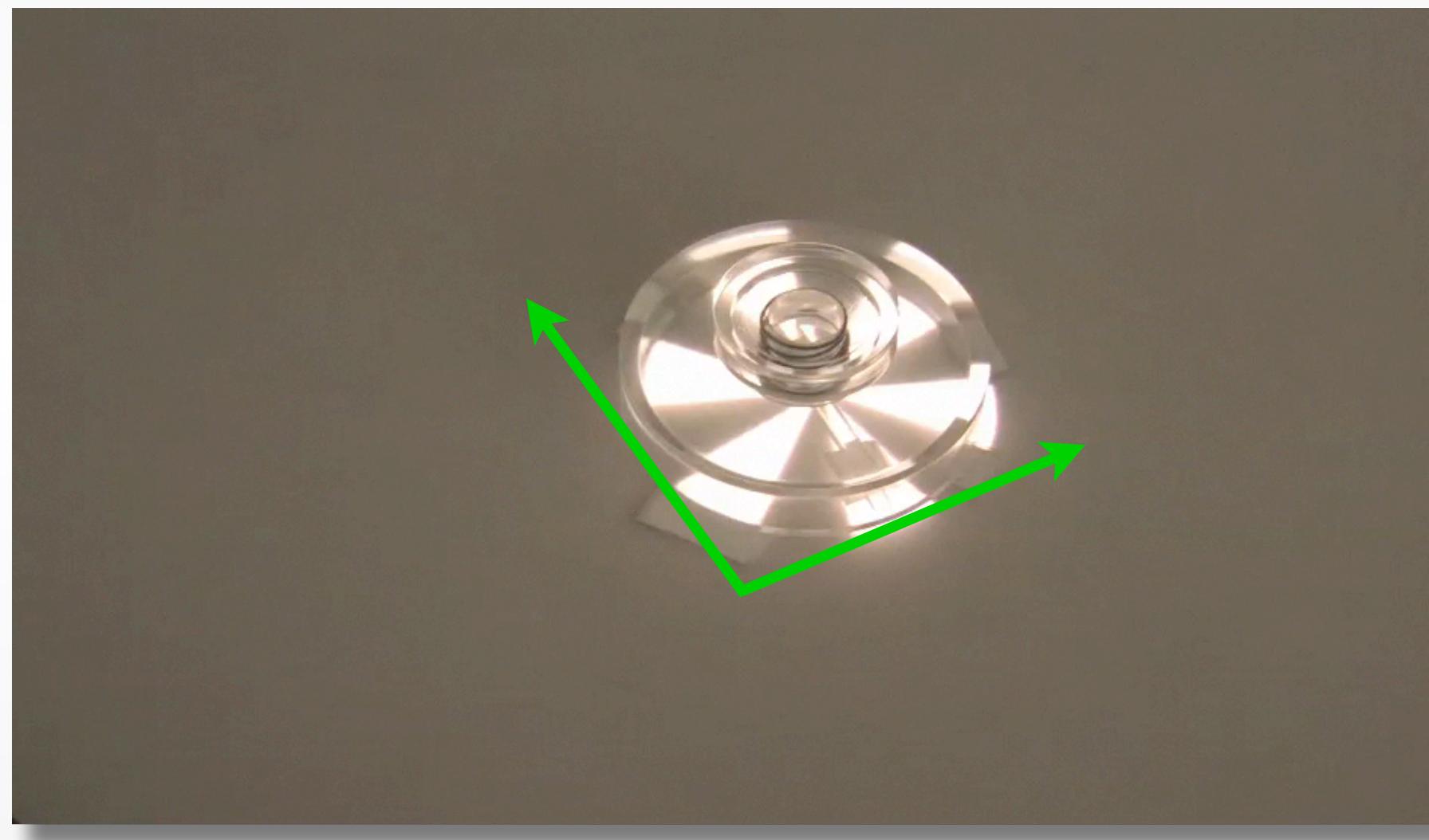
Pairing



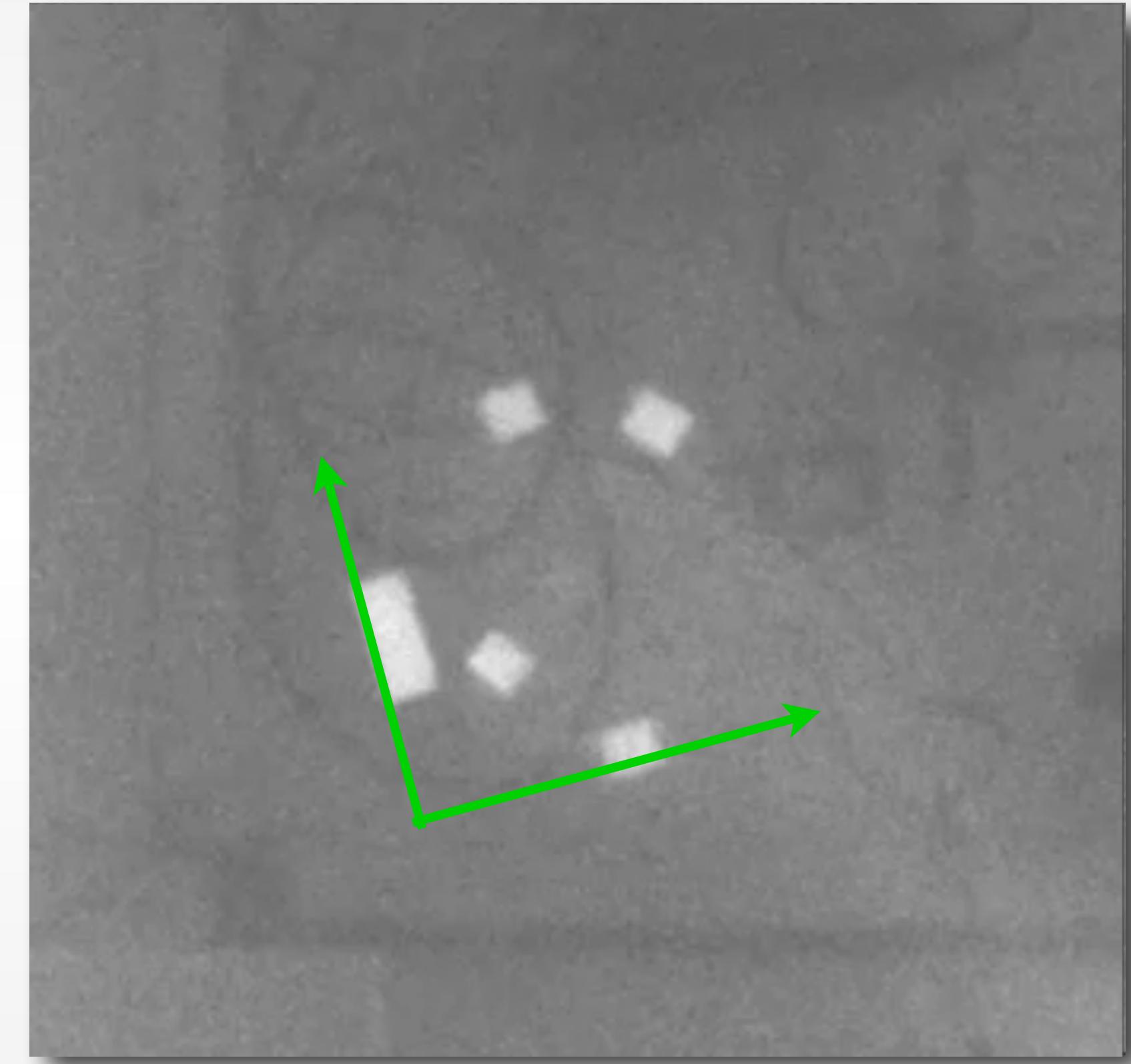
Multi-Touch Table



Widget Detection



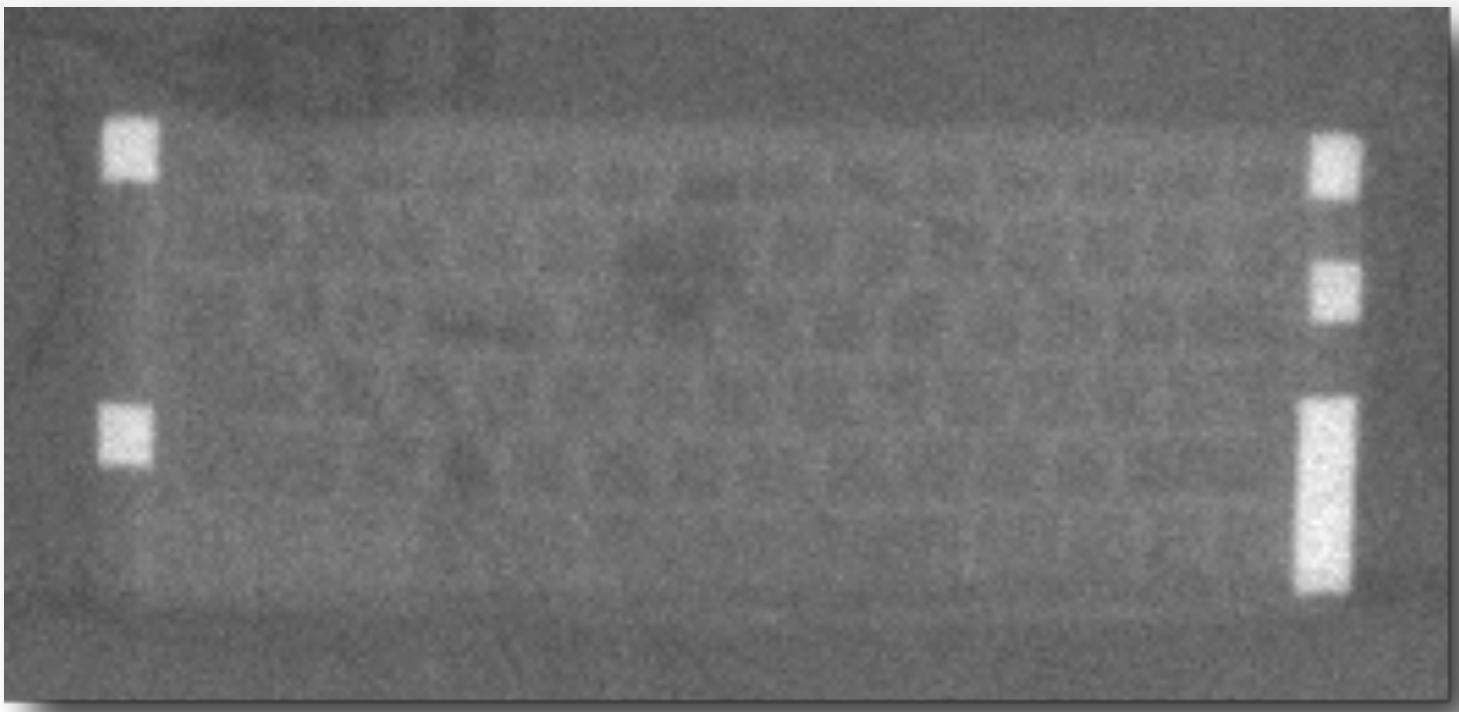
Tabletop view



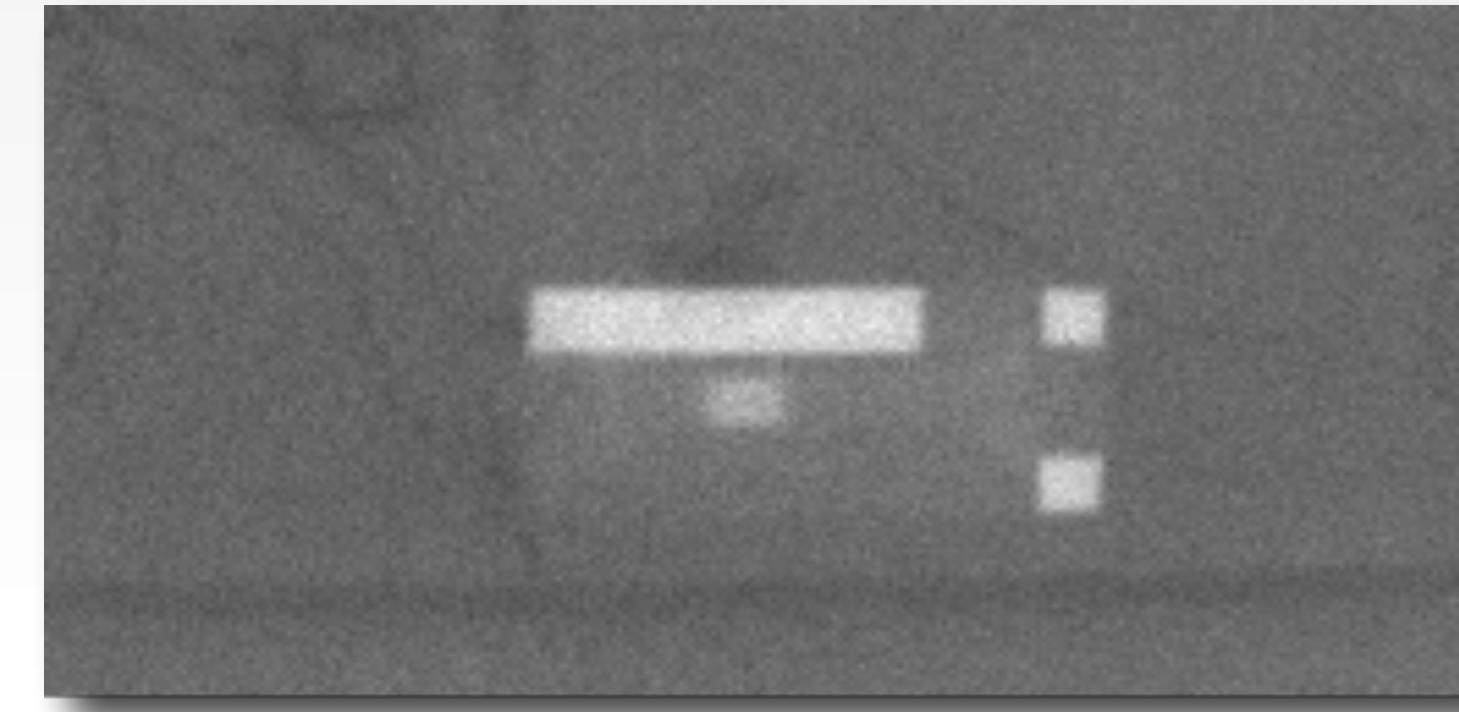
IR camera view
(640x480, 120fps)

Widget Detection

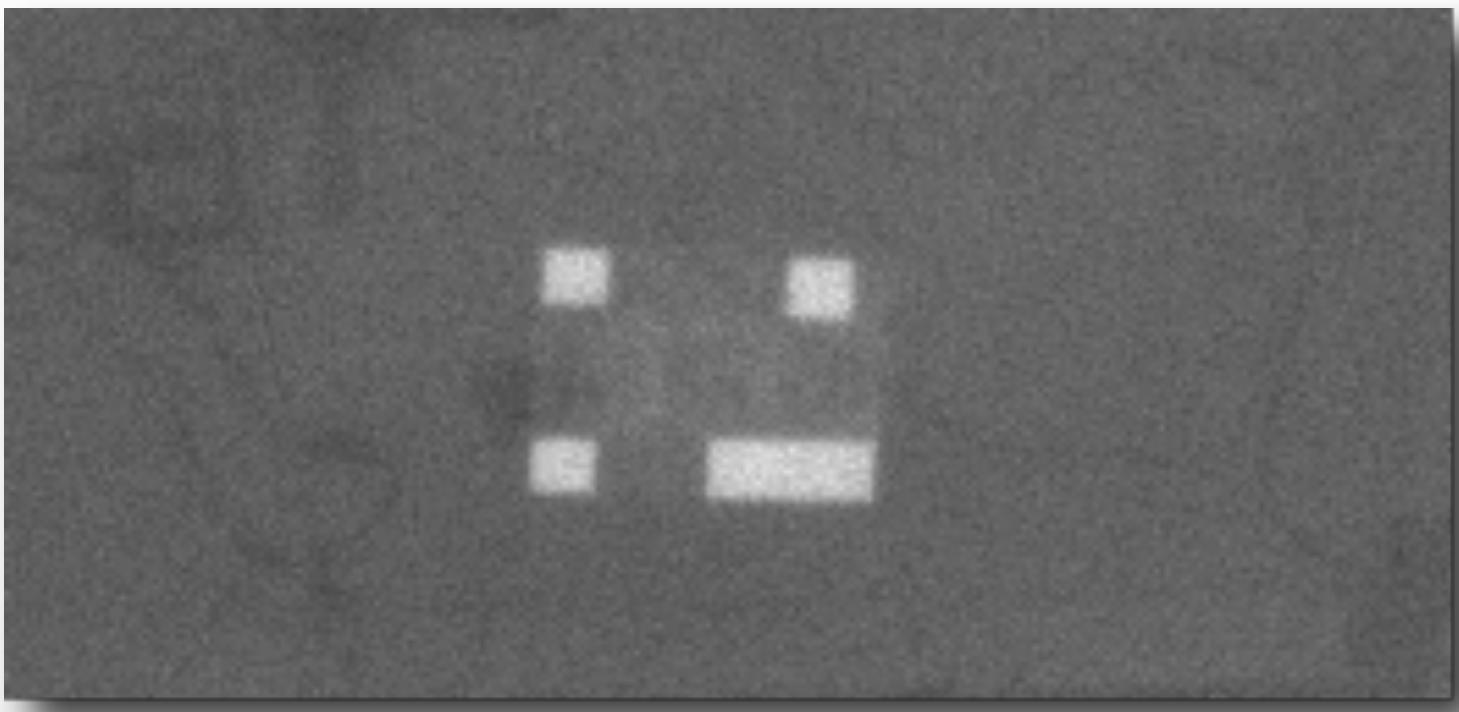
Keyboard



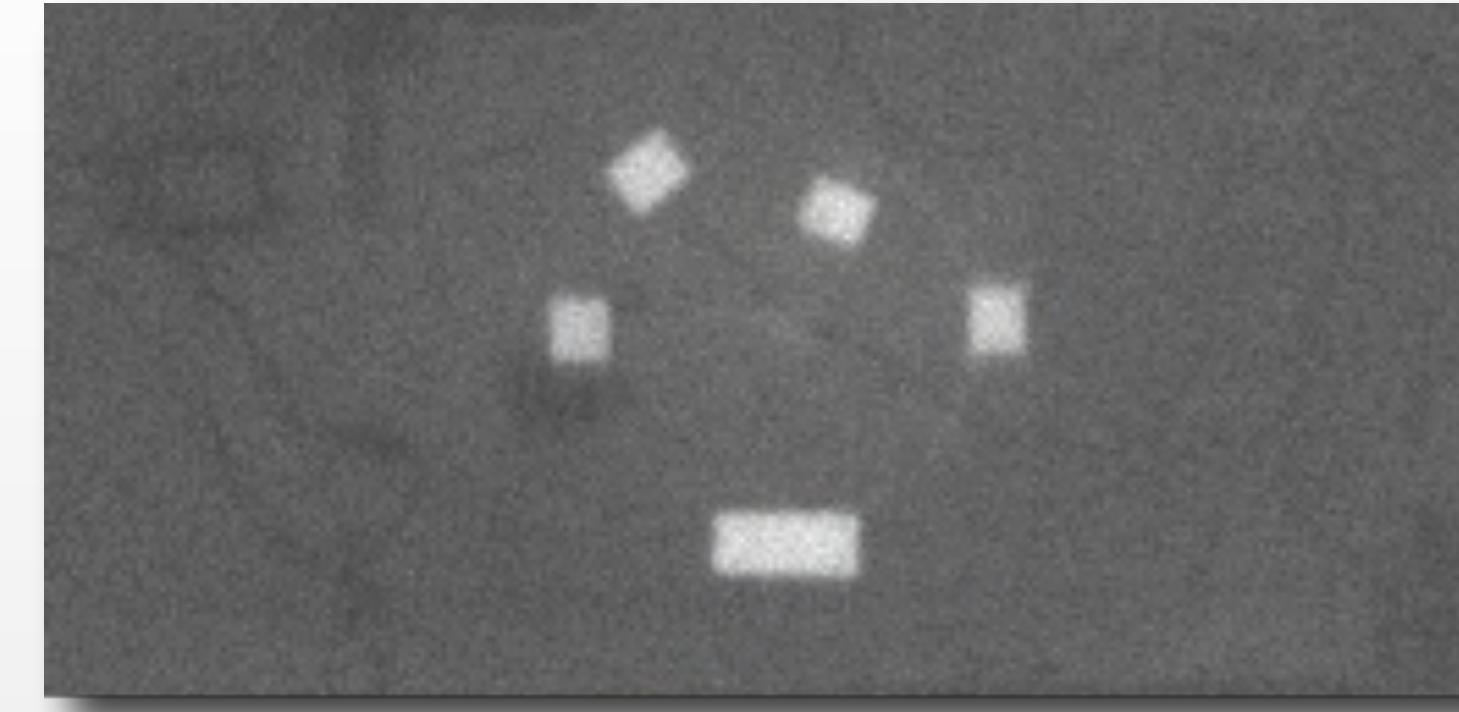
Slider



Keypad



Knob



The eLabBench



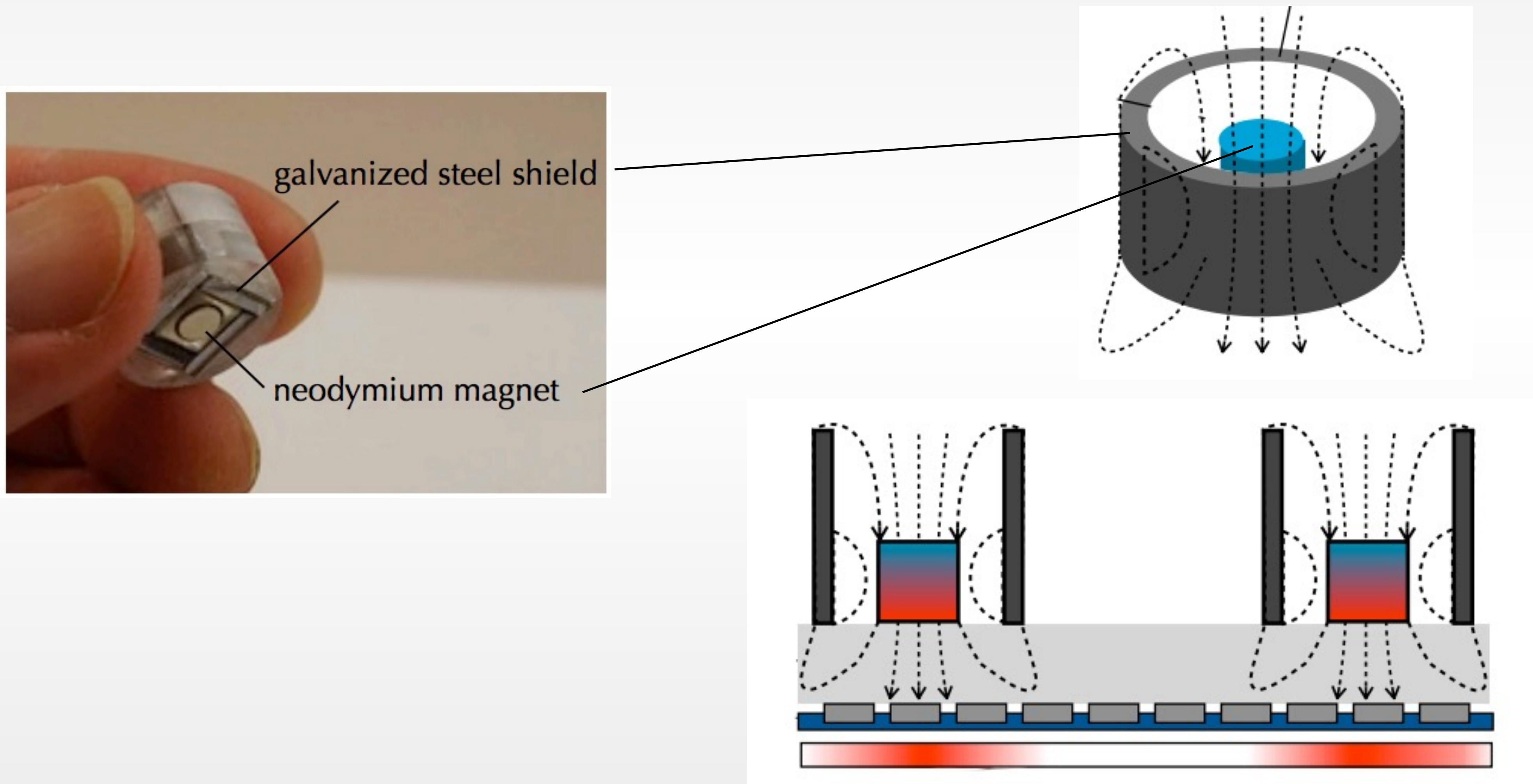
[Tabard et al. ITS '11]

The eLabBench

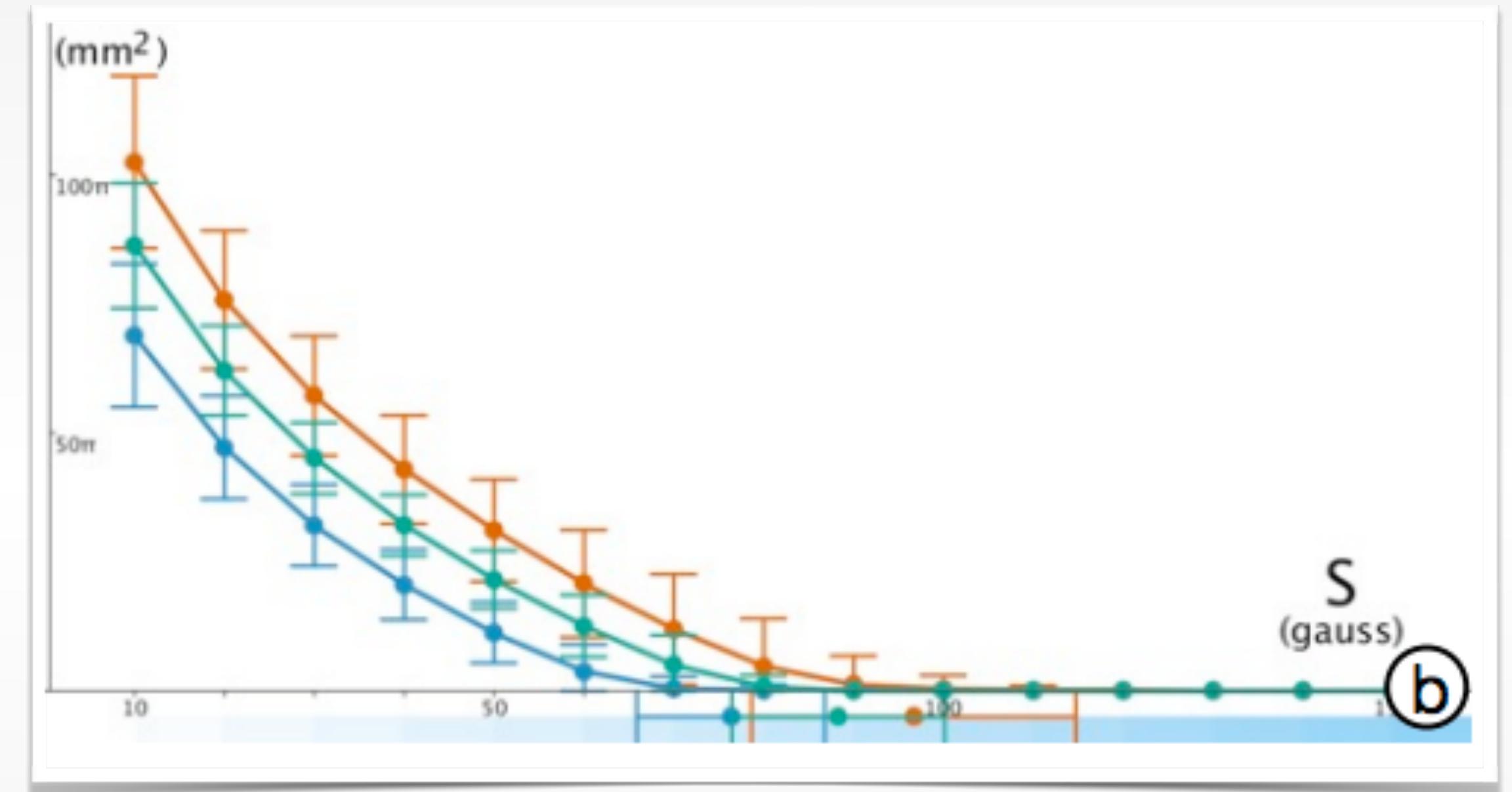
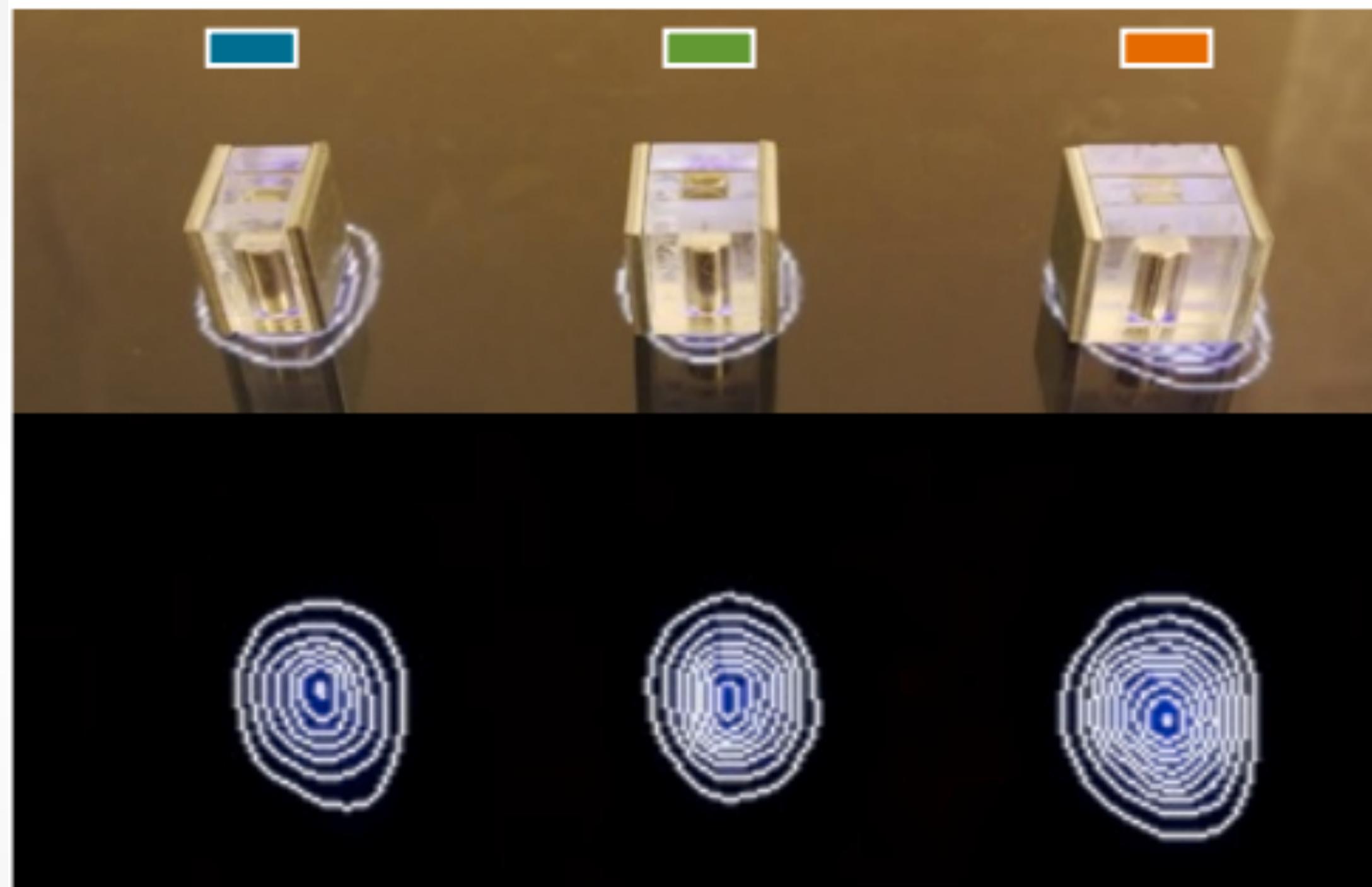


[Tabard et al. ITS '11]

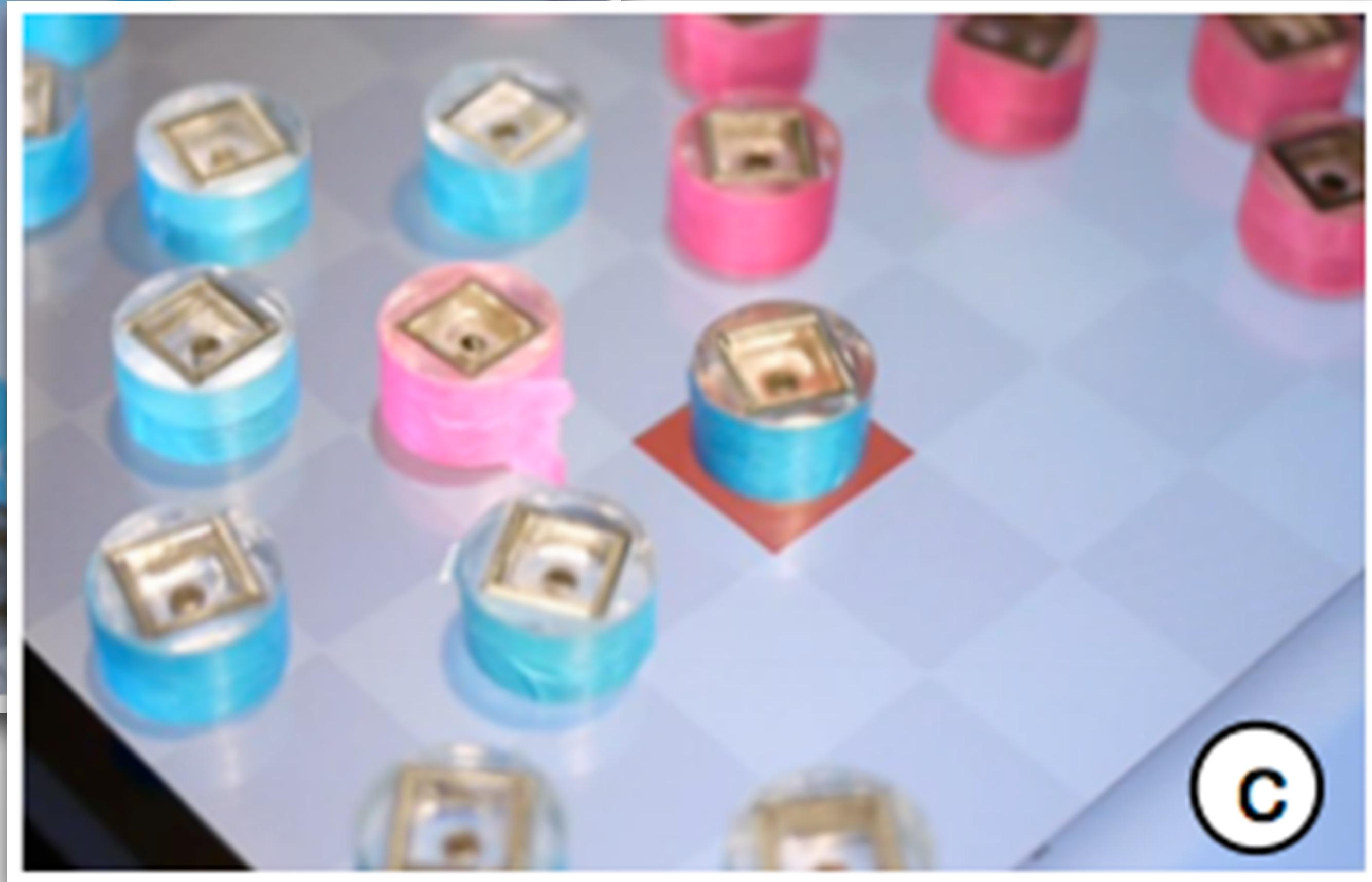
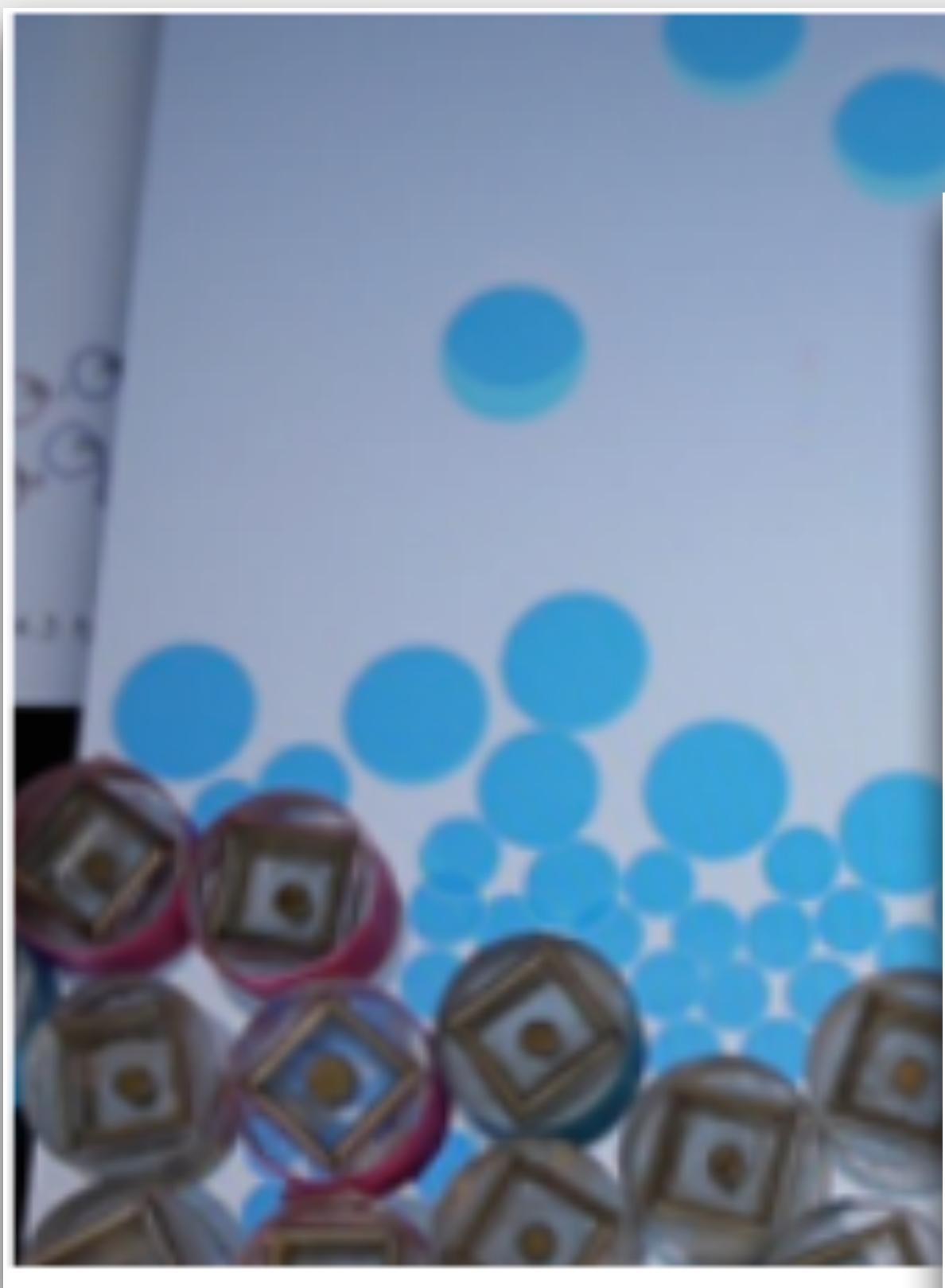
GaussStones



[Liang et al. UIST '14]

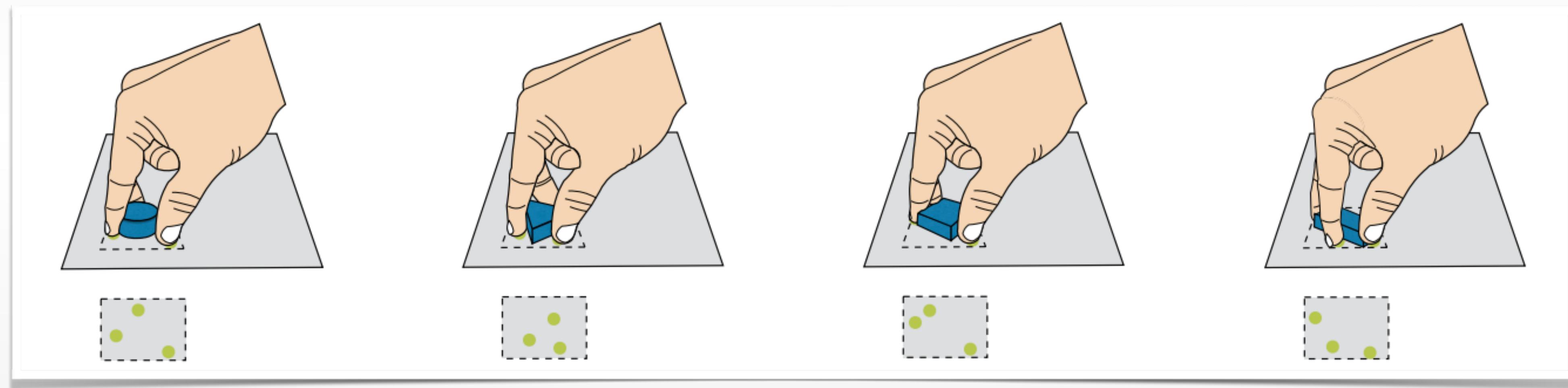


[Liang et al. UIST '14]



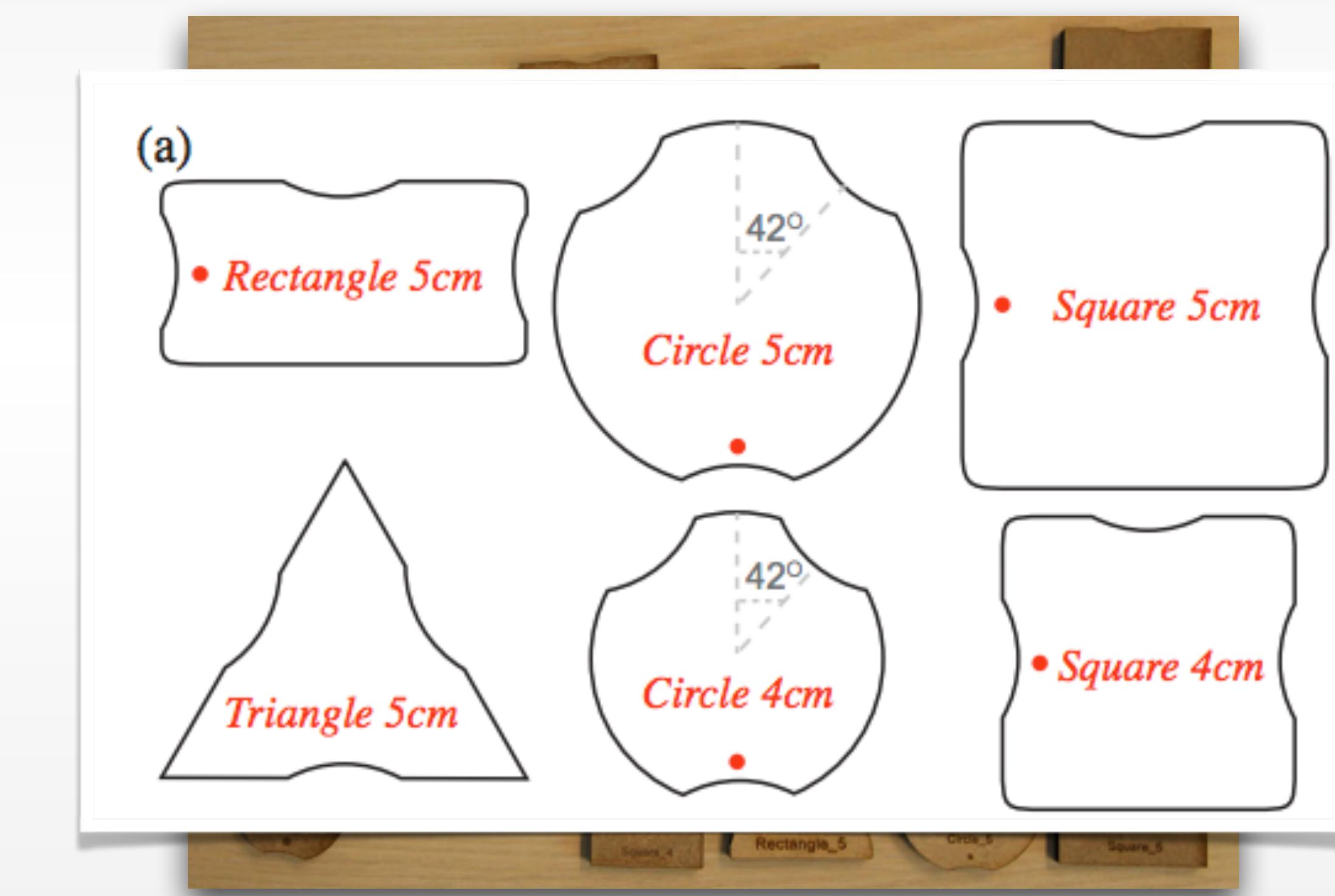
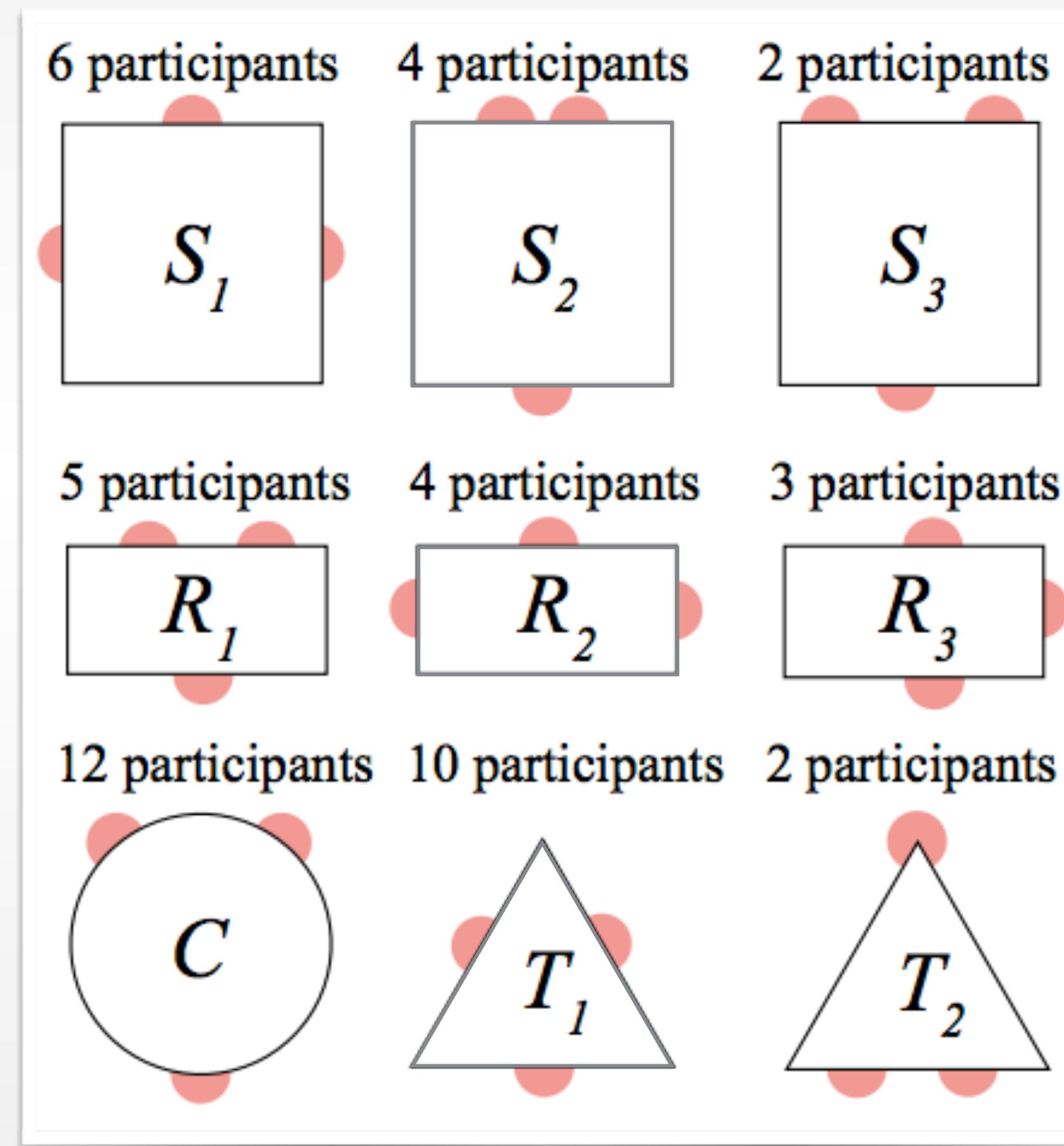
[Liang et al. UIST '14]

TouchesTokens



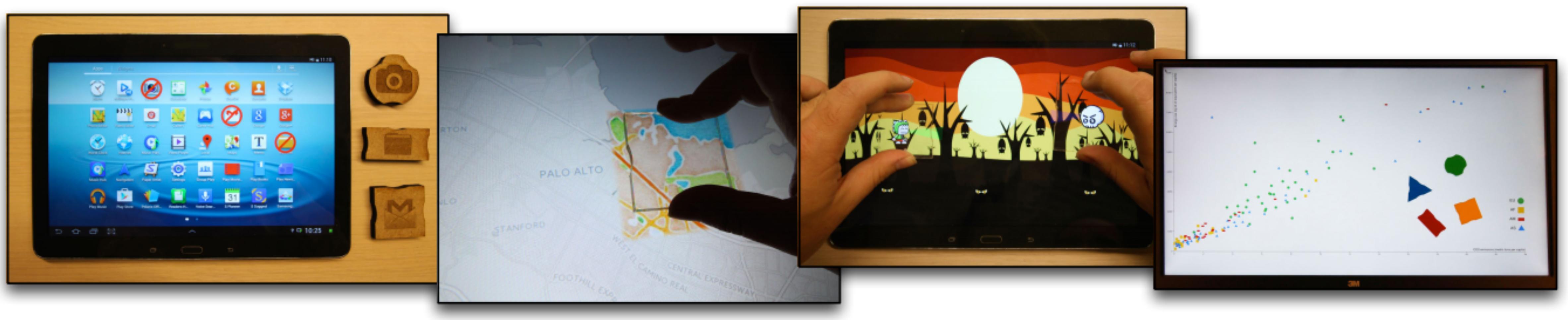
[Gonzalez et al. CHI '16]

TouchesTokens



[Gonzalez et al. CHI '16]

TouchesTokens

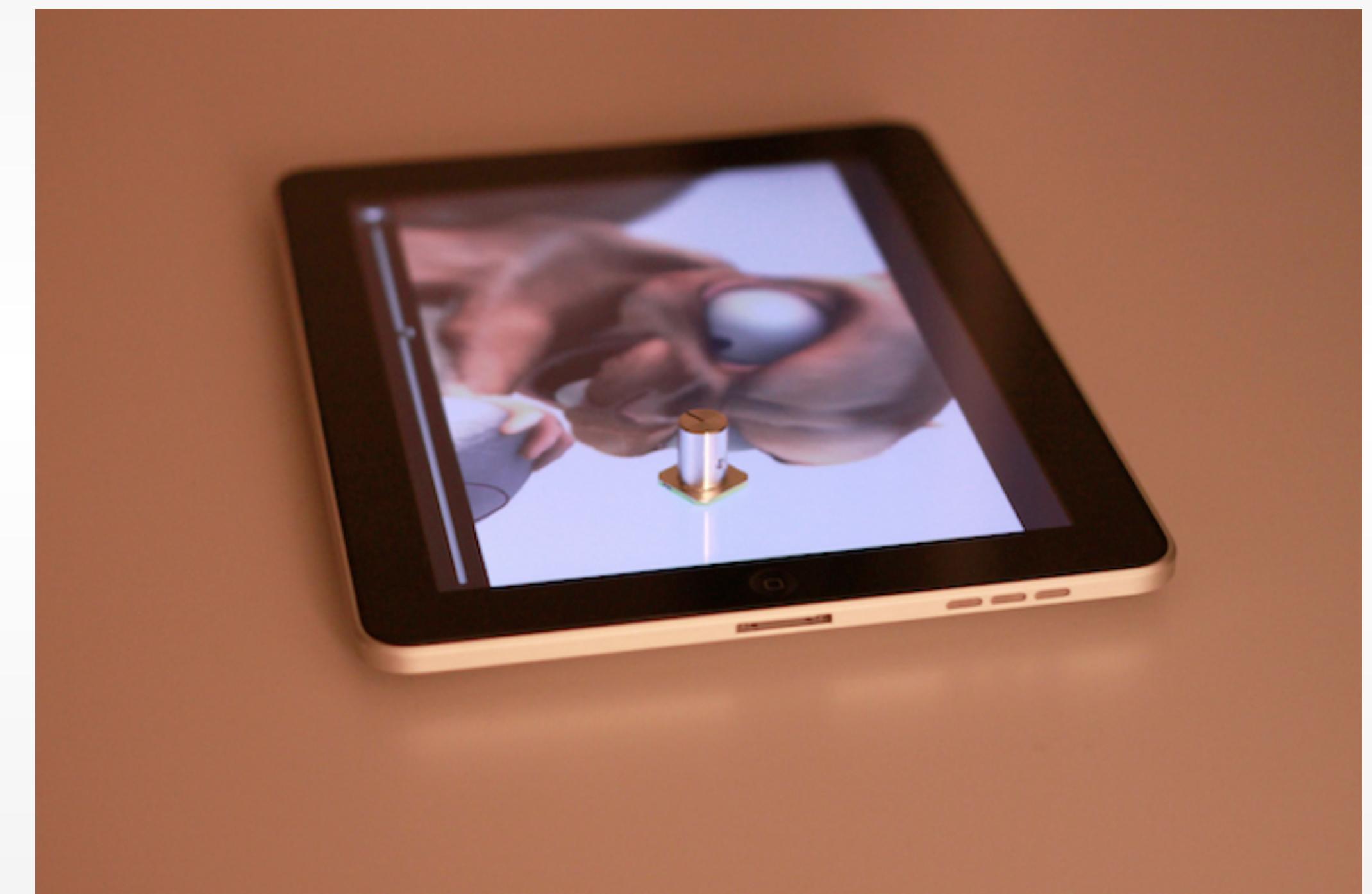


[Gonzalez et al. CHI '16]

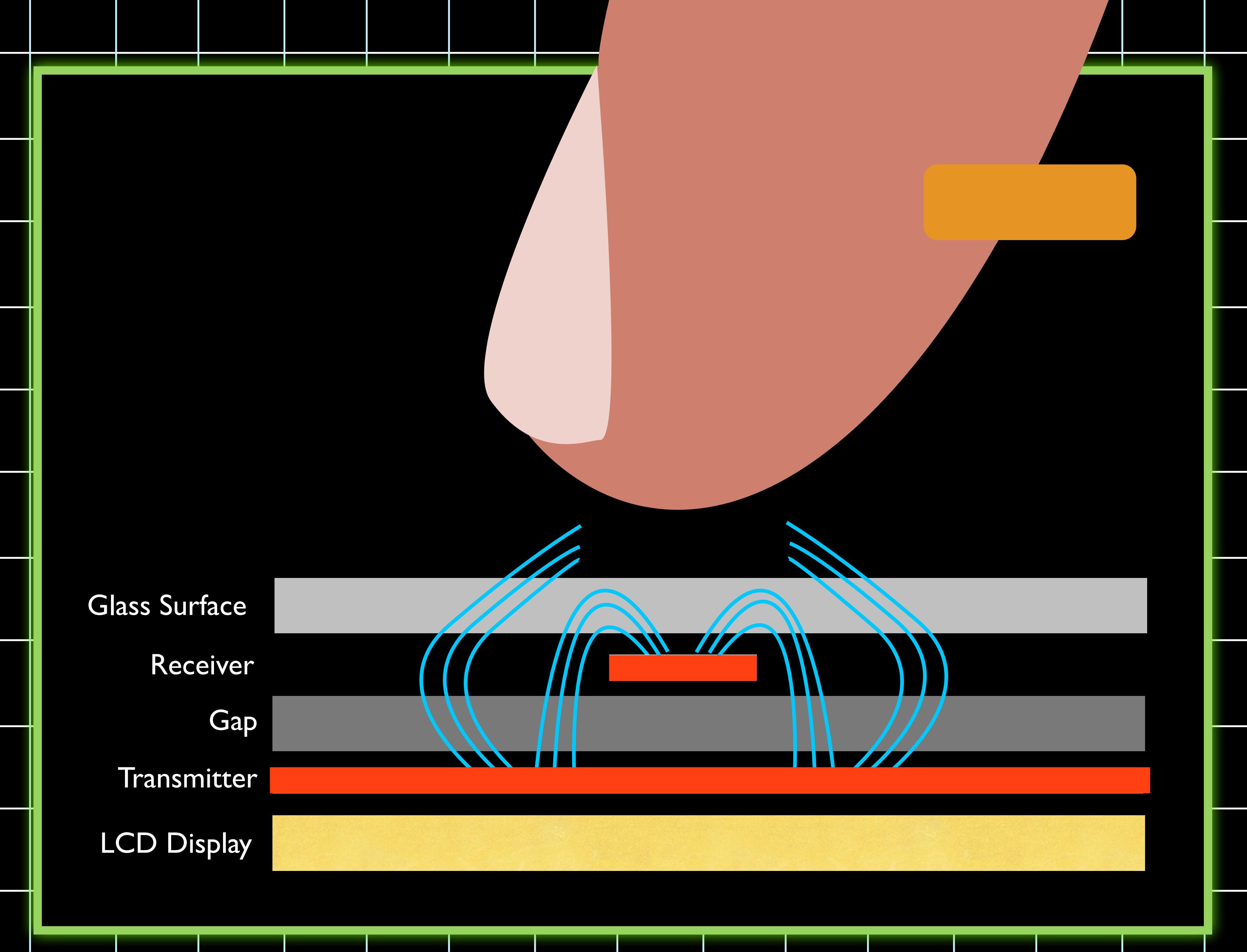
Tangibles on Capacitive Touch Screens



Capstones [Chan et al. CHI 2012]



CapWidgets [Kratz et al. CHI 2011]



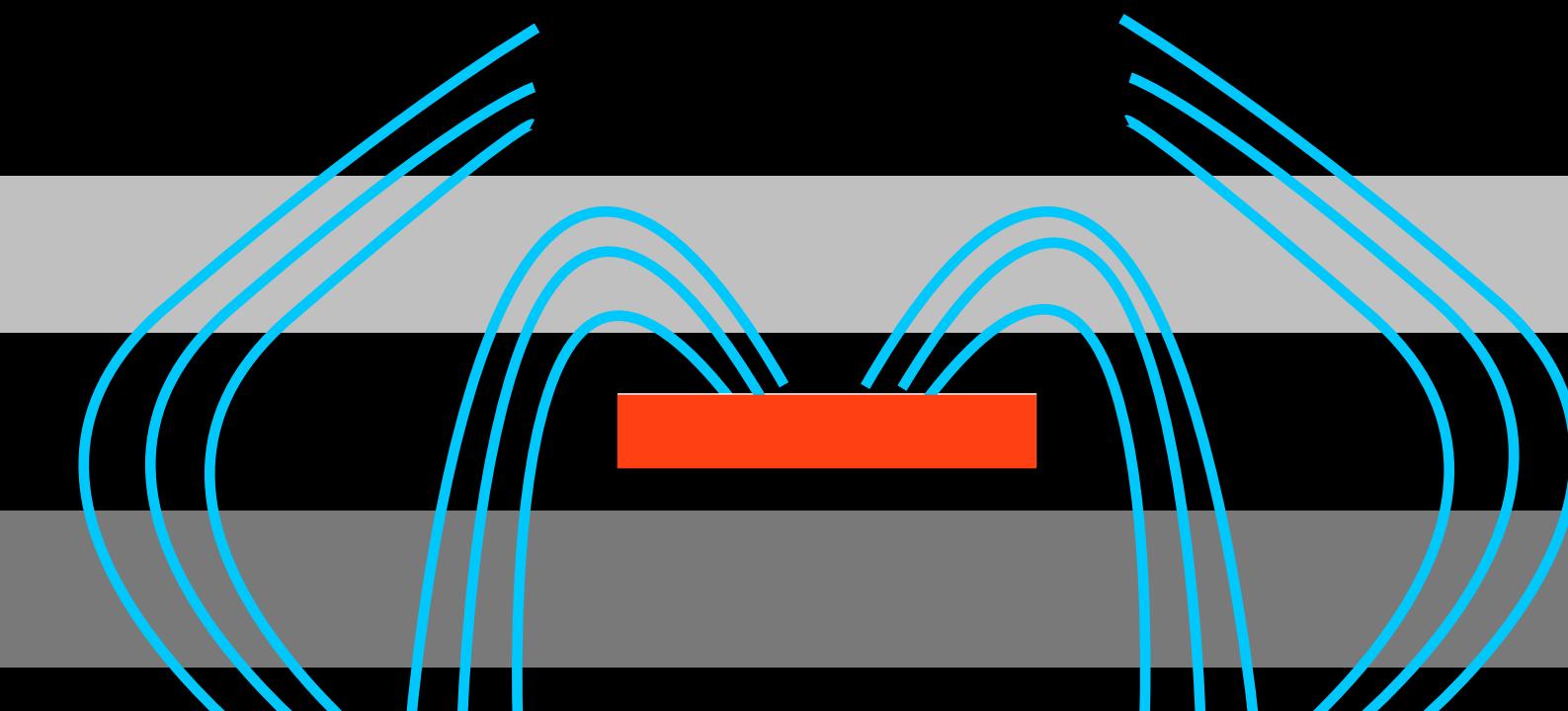
Glass Surface

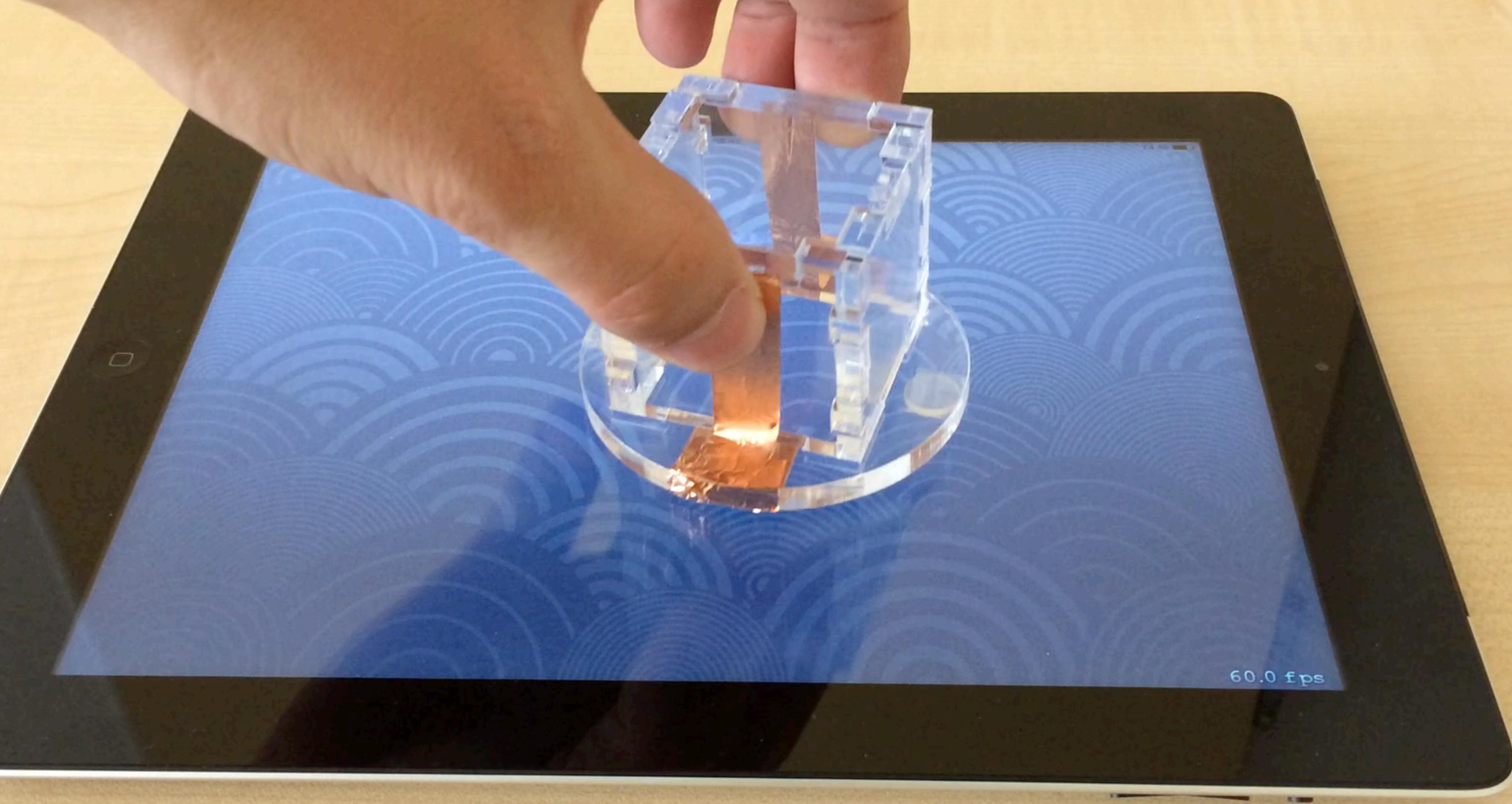
Receiver

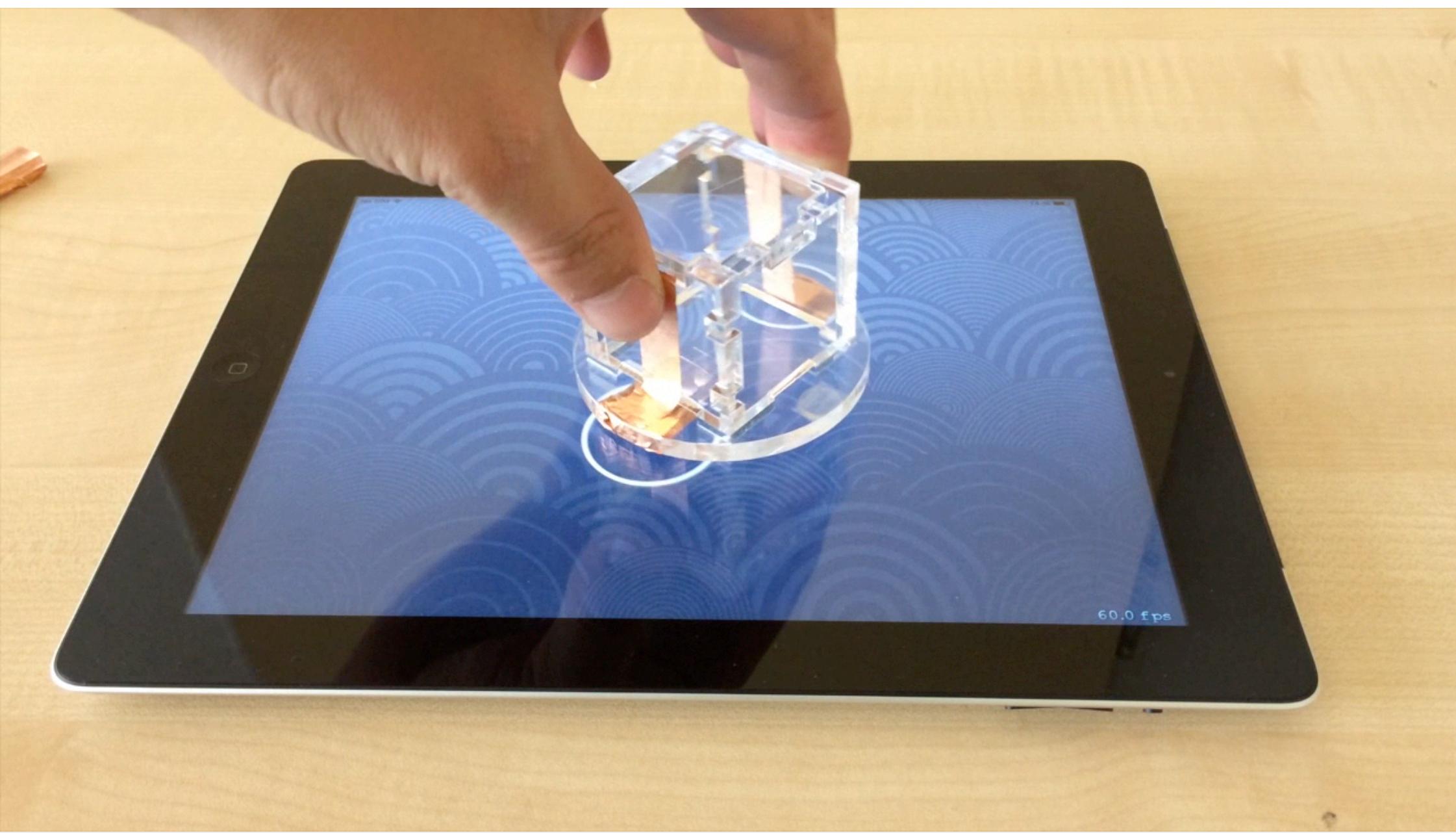
Gap

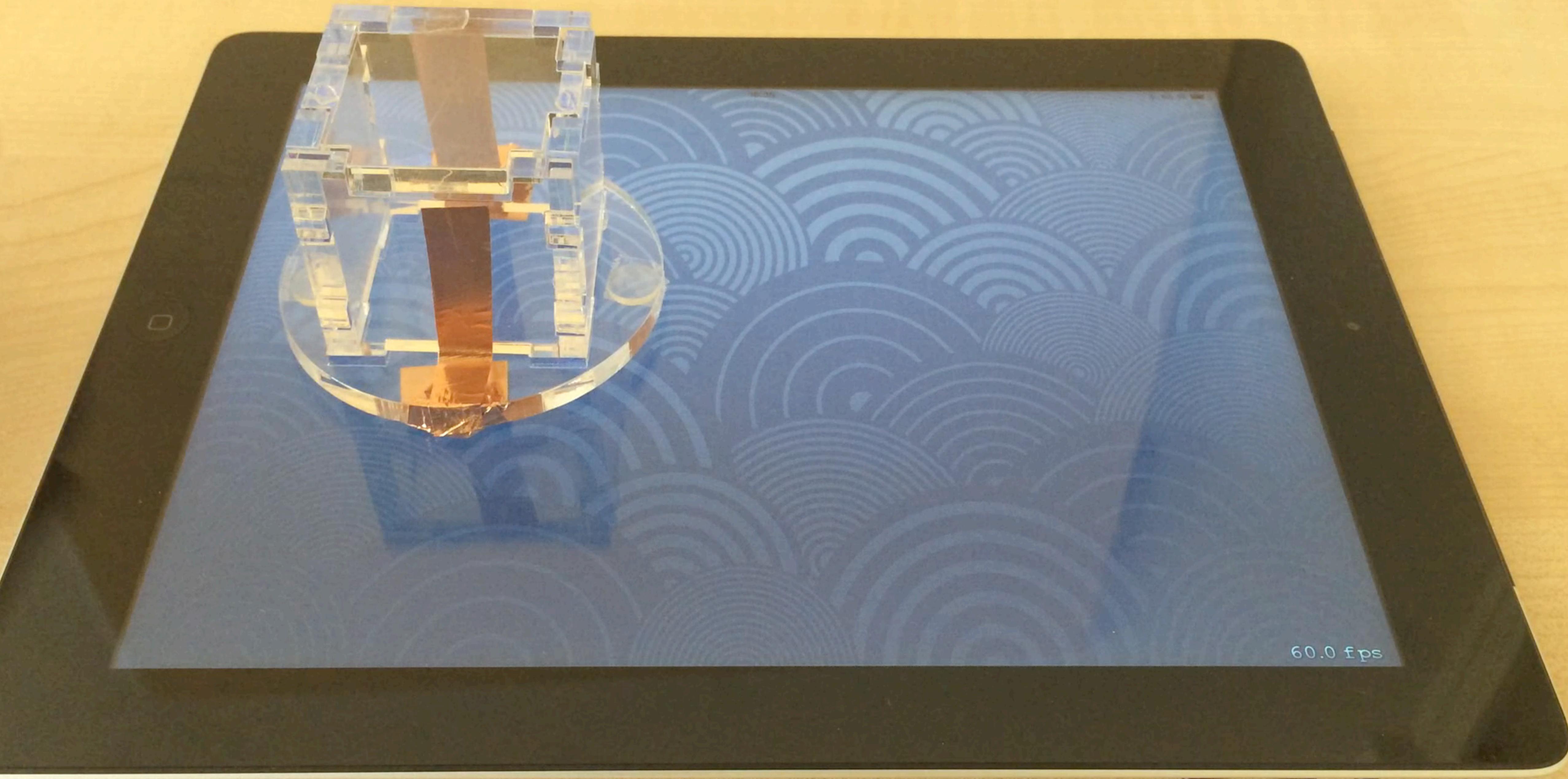
Transmitter

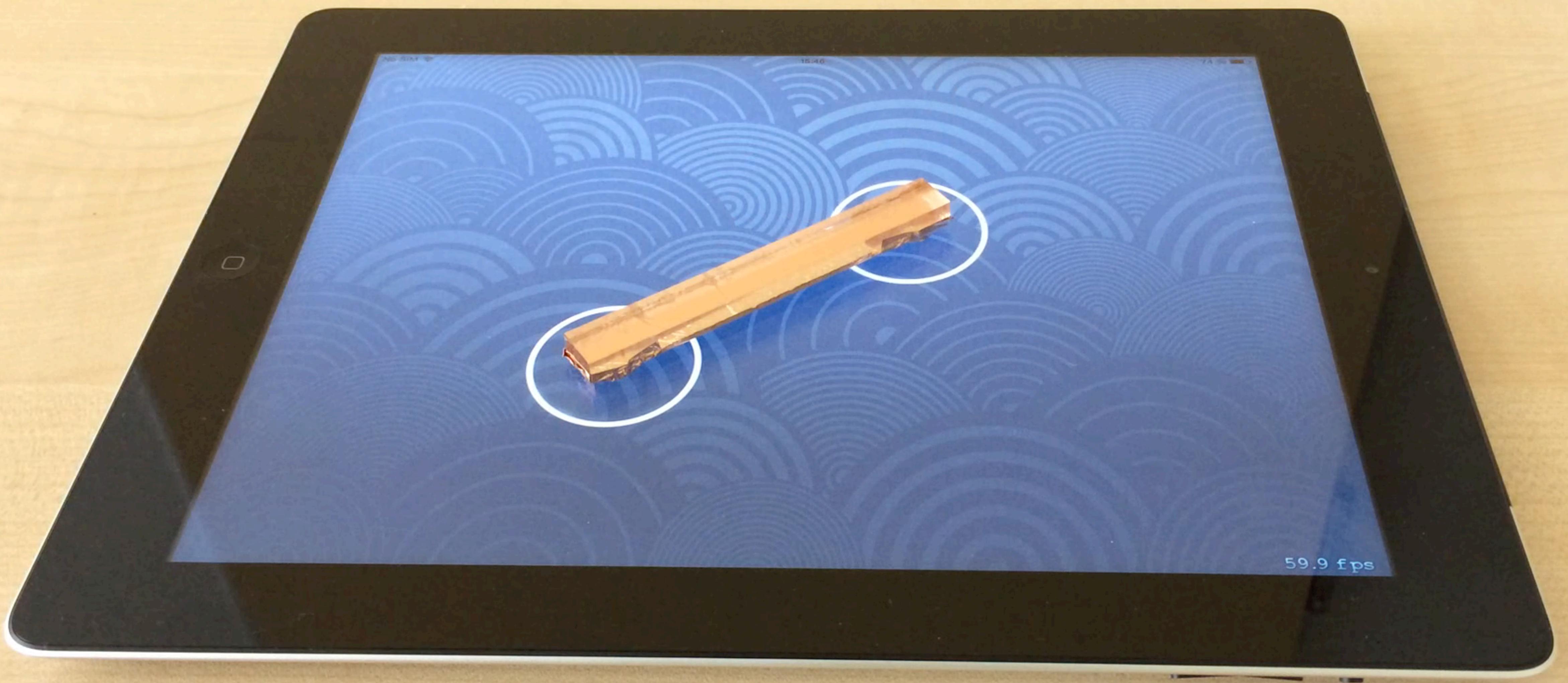
LCD Display

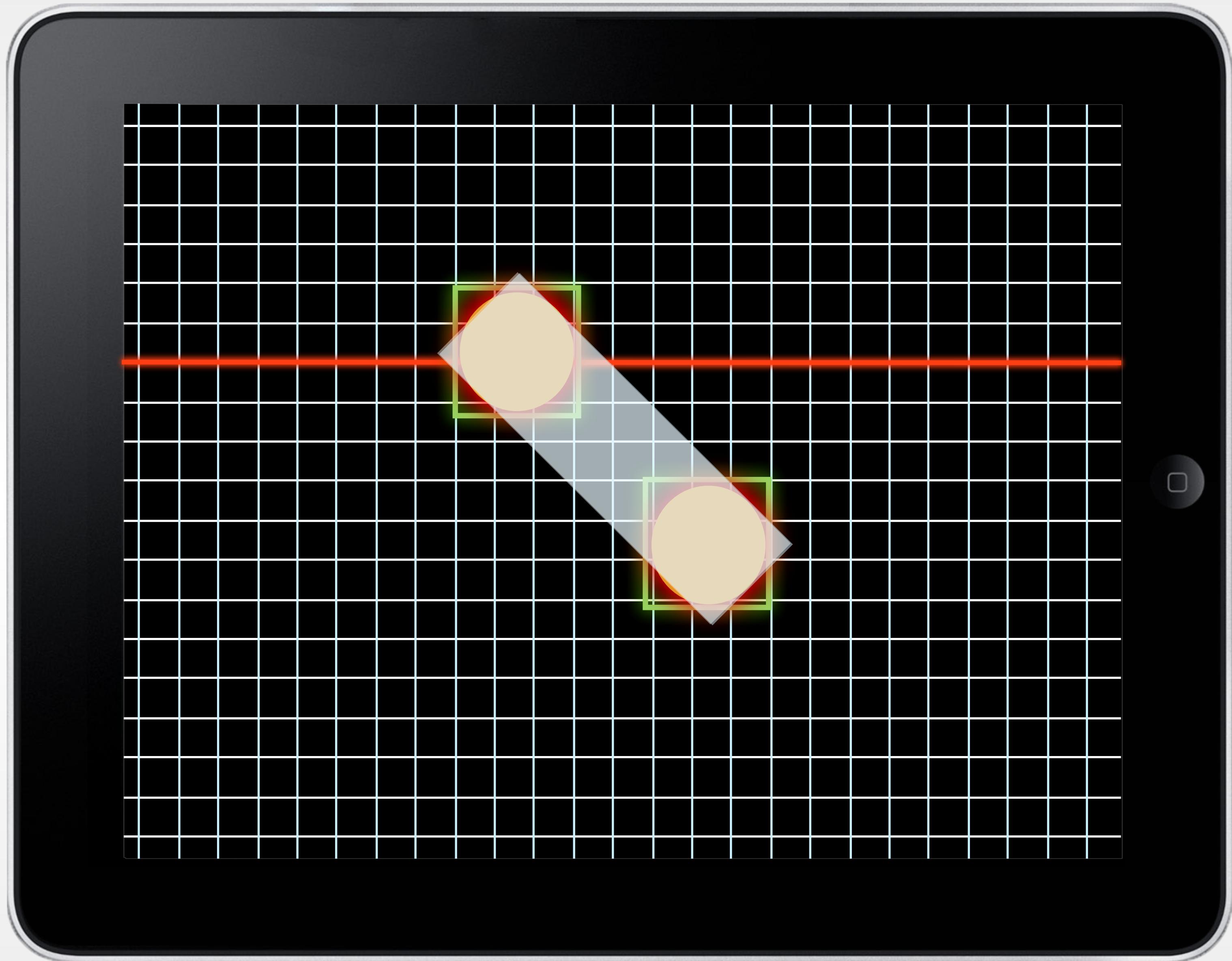


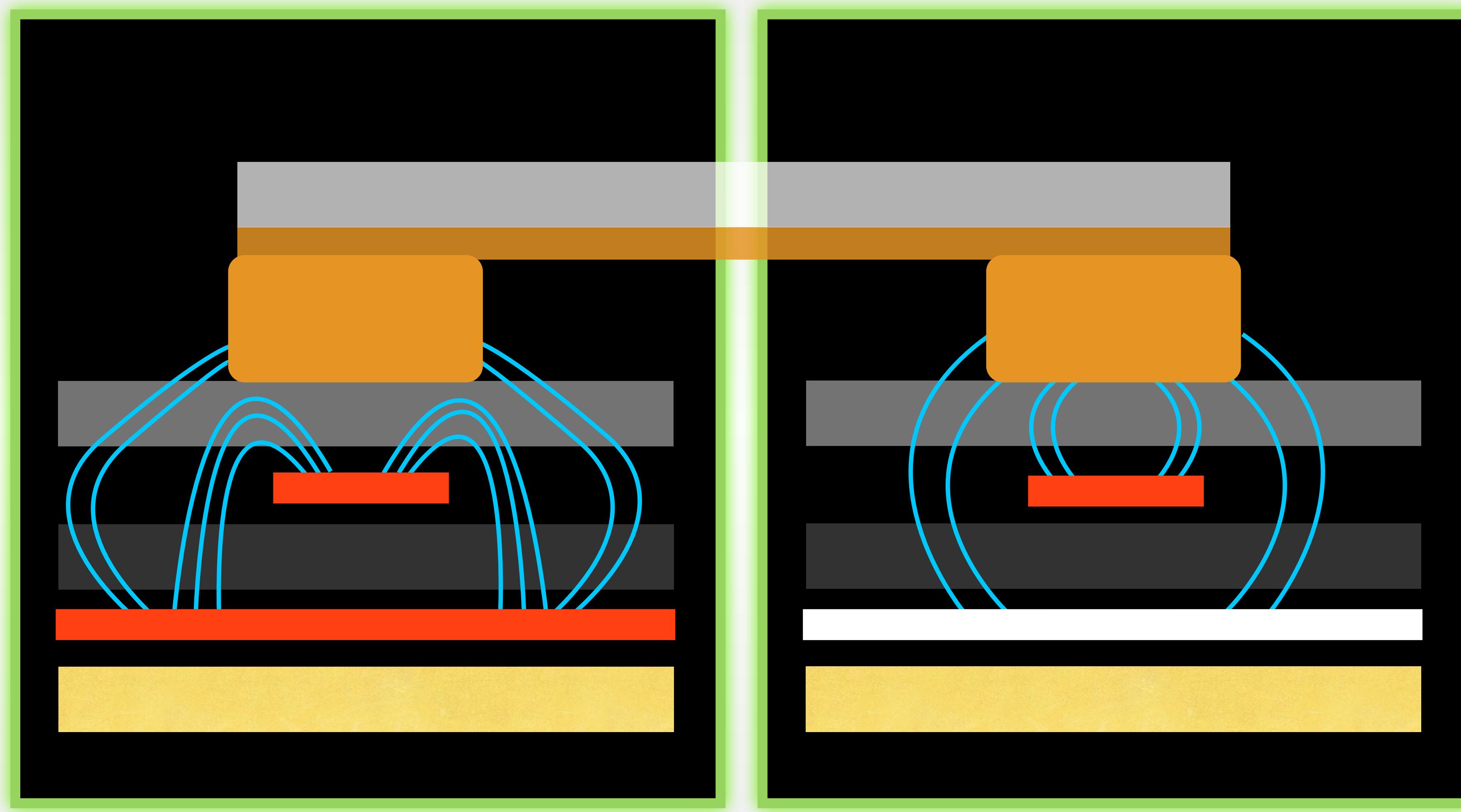


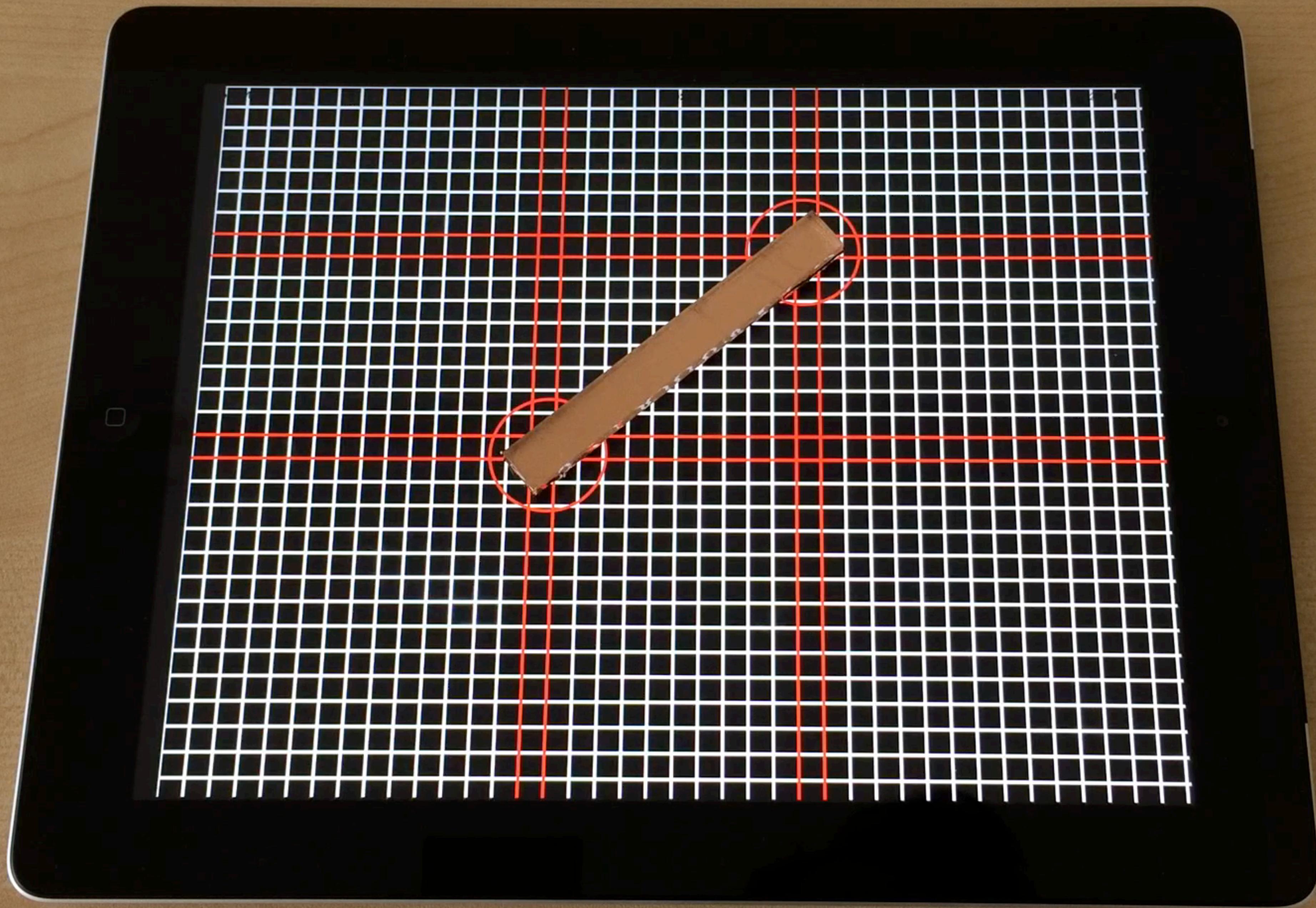


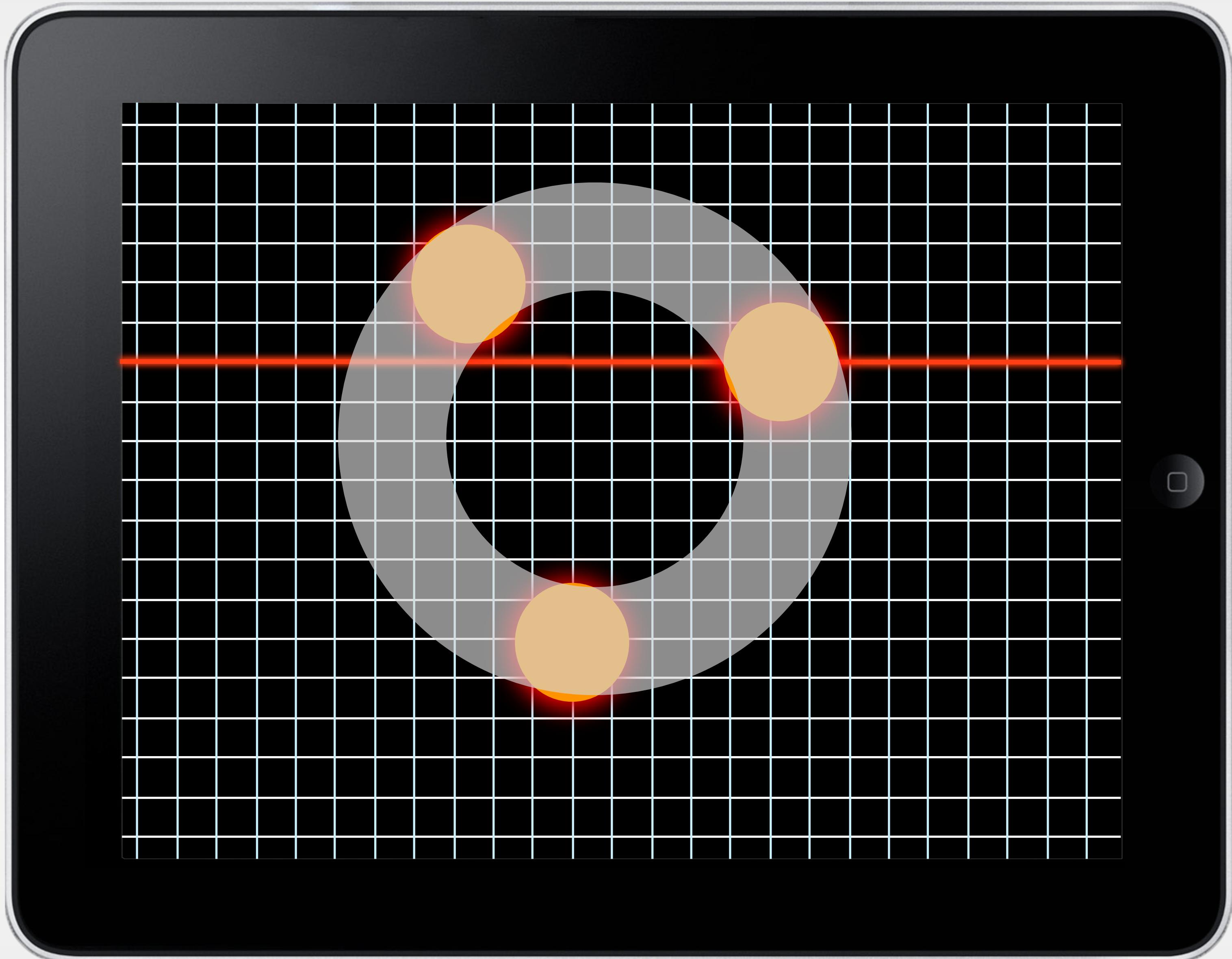




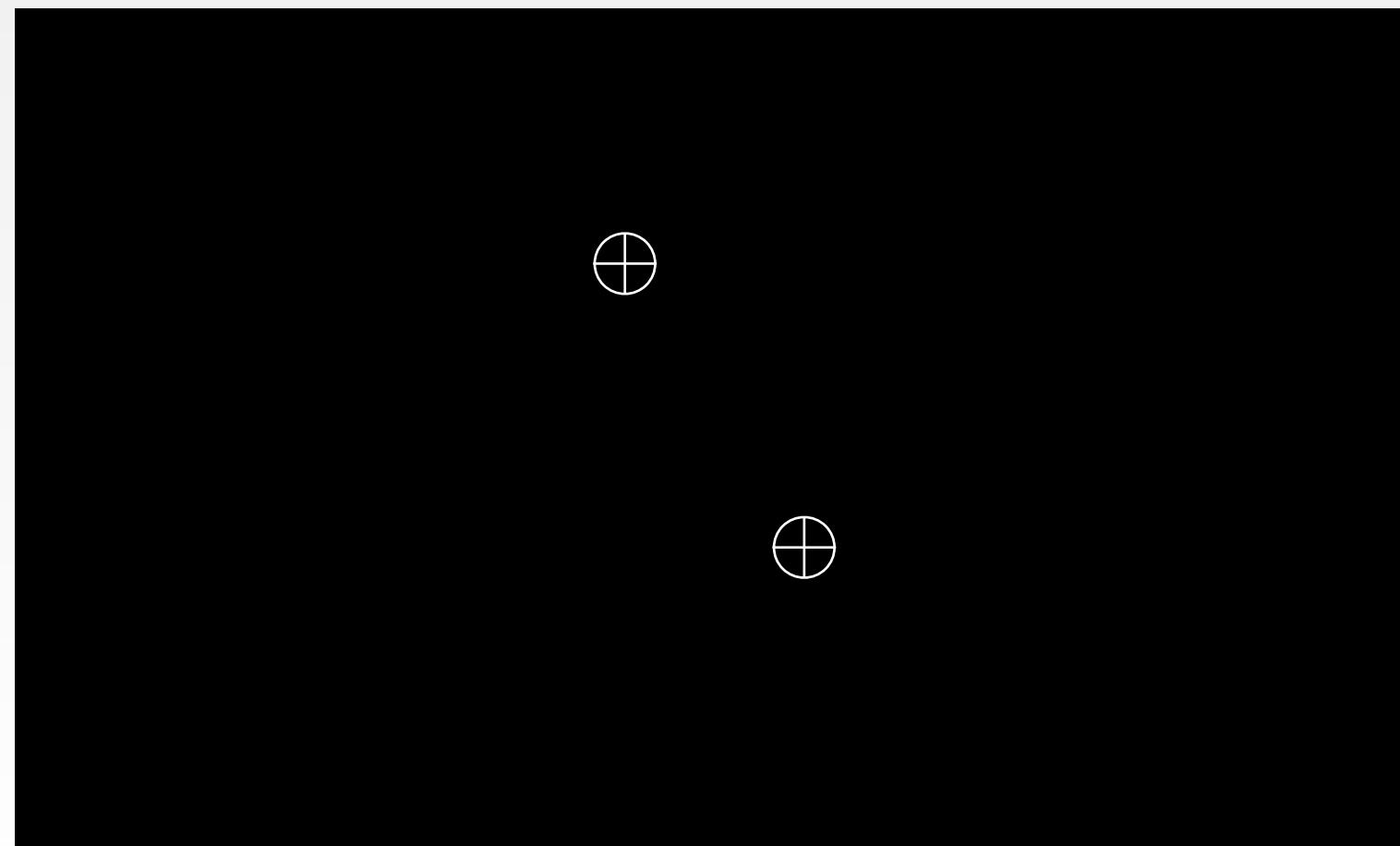
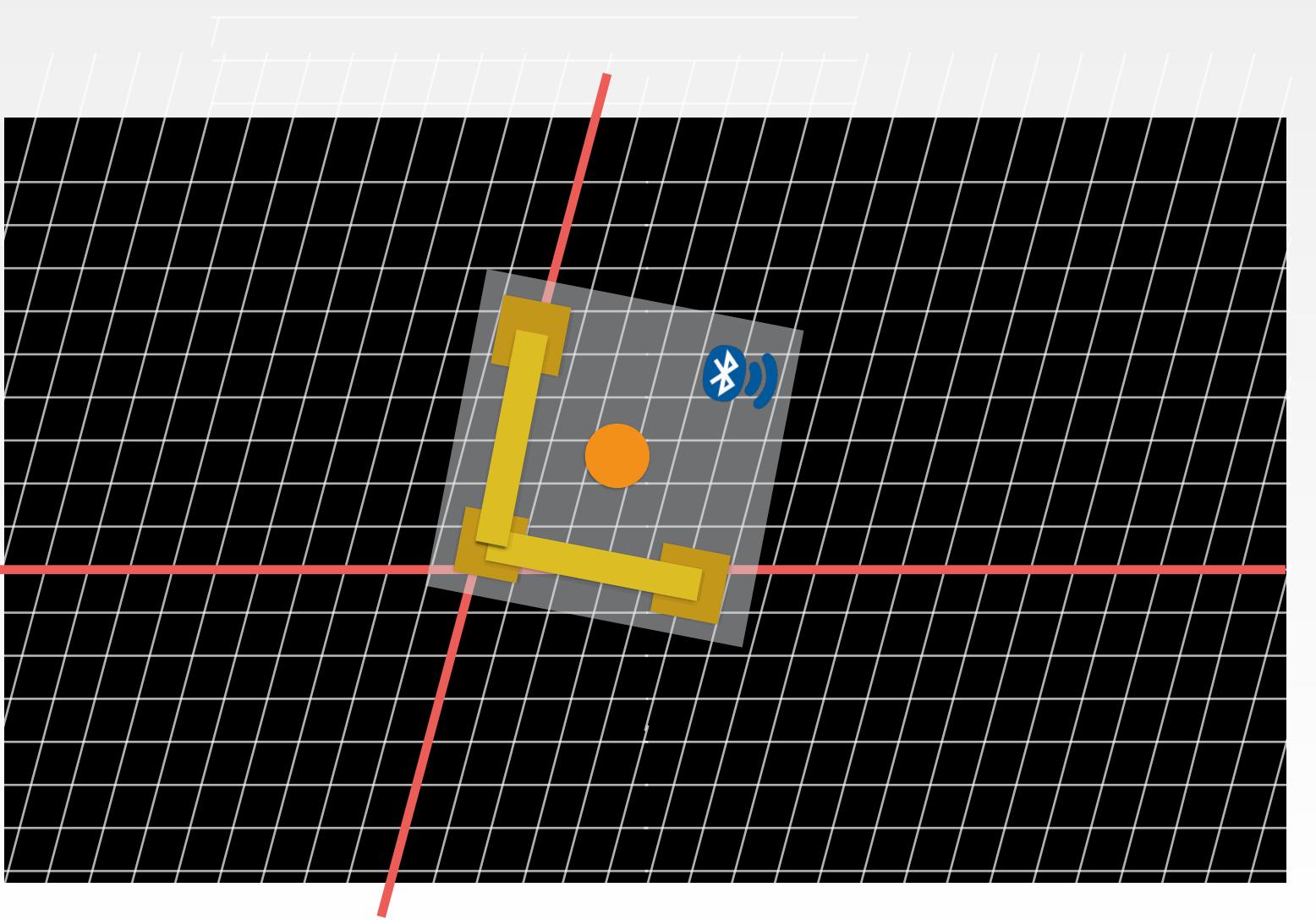




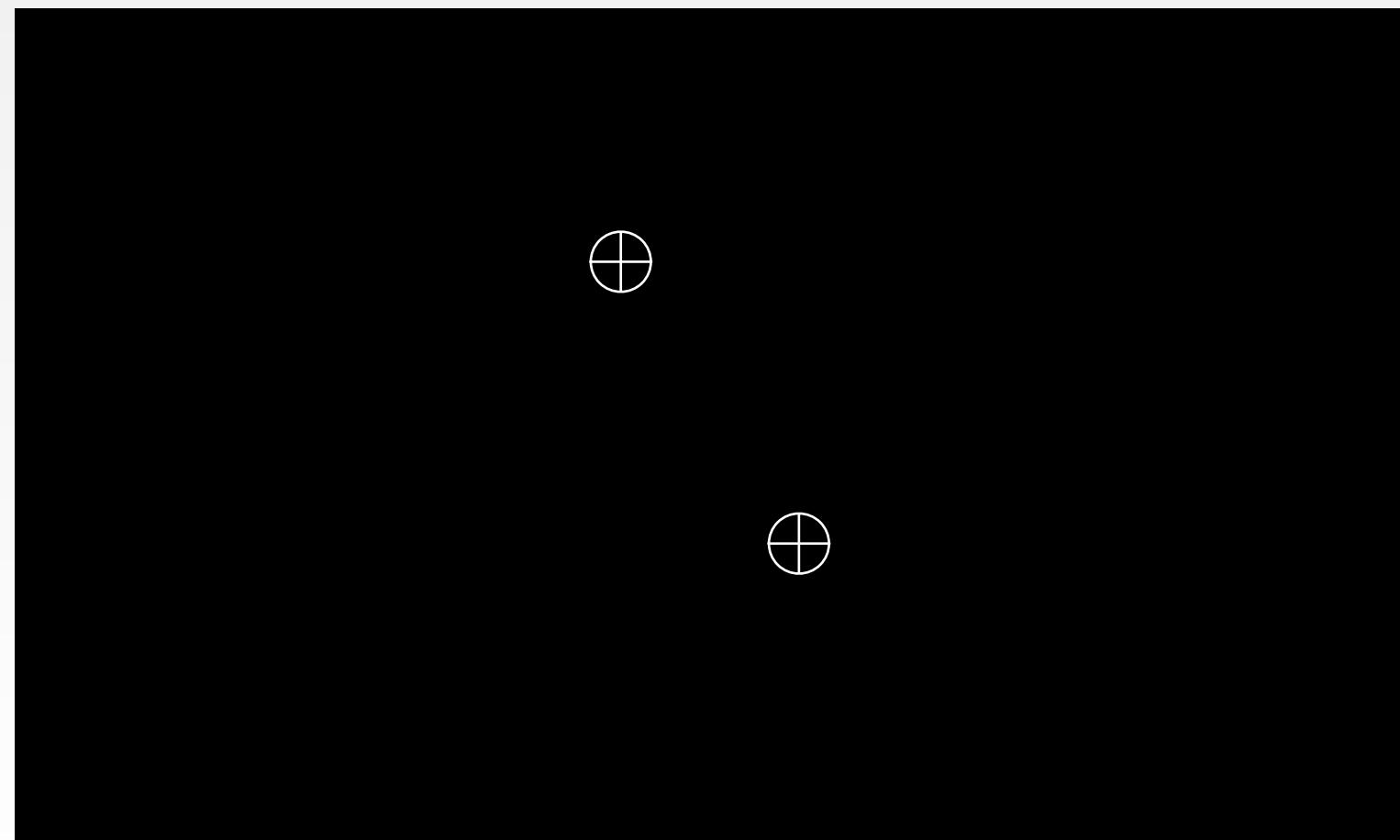
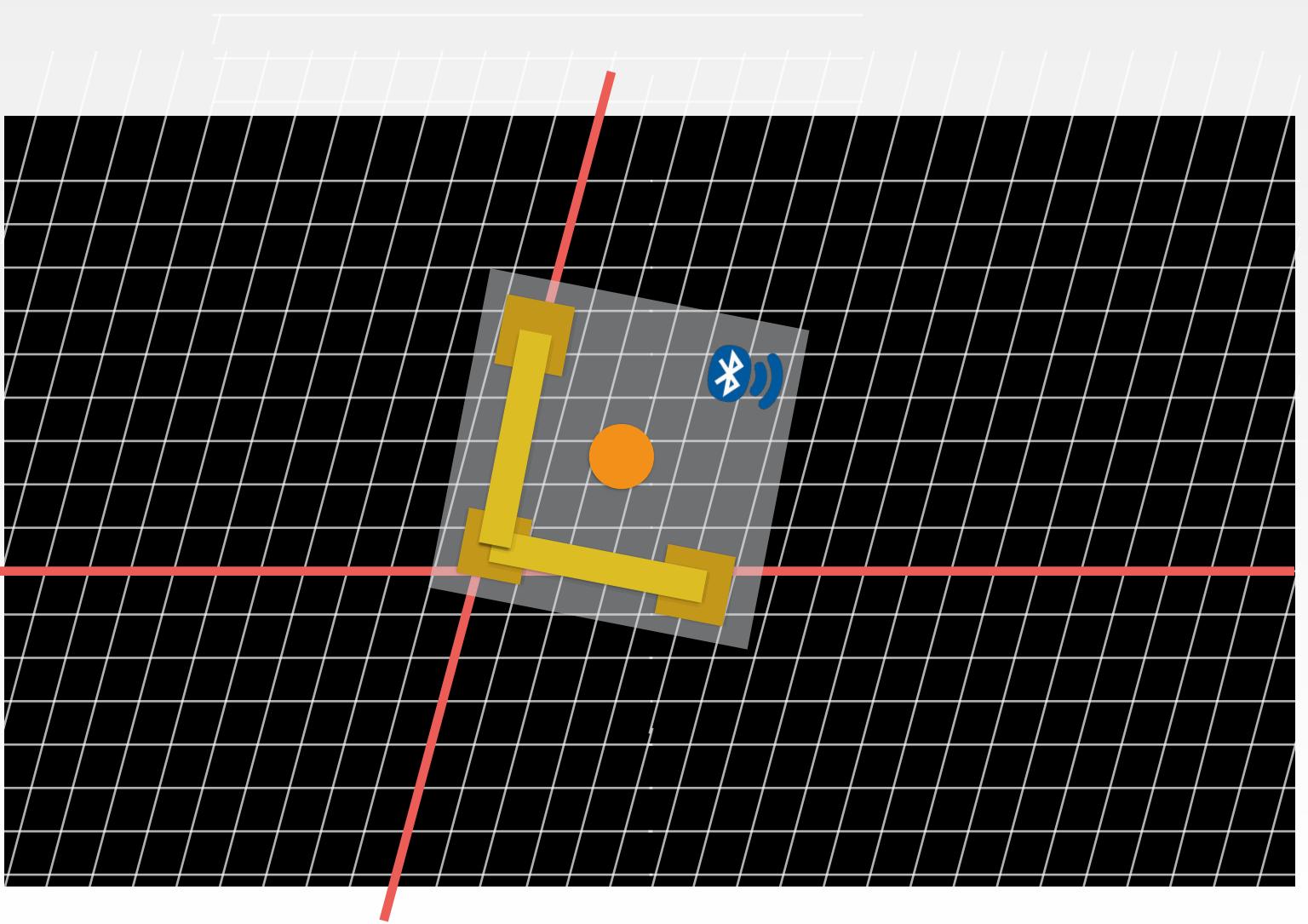




I. Problem: Marker detection



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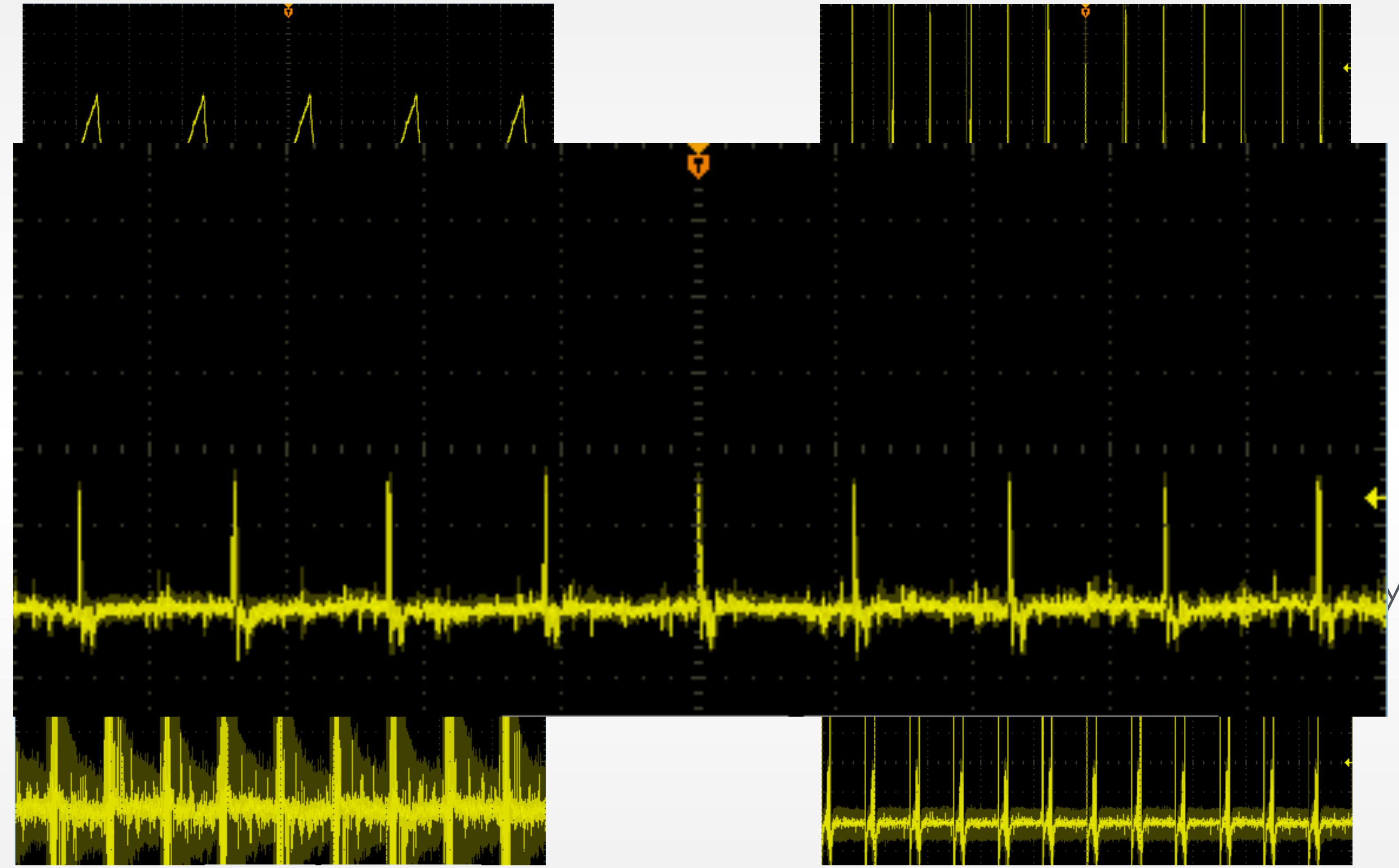


2. Problem: Adaptive filtering



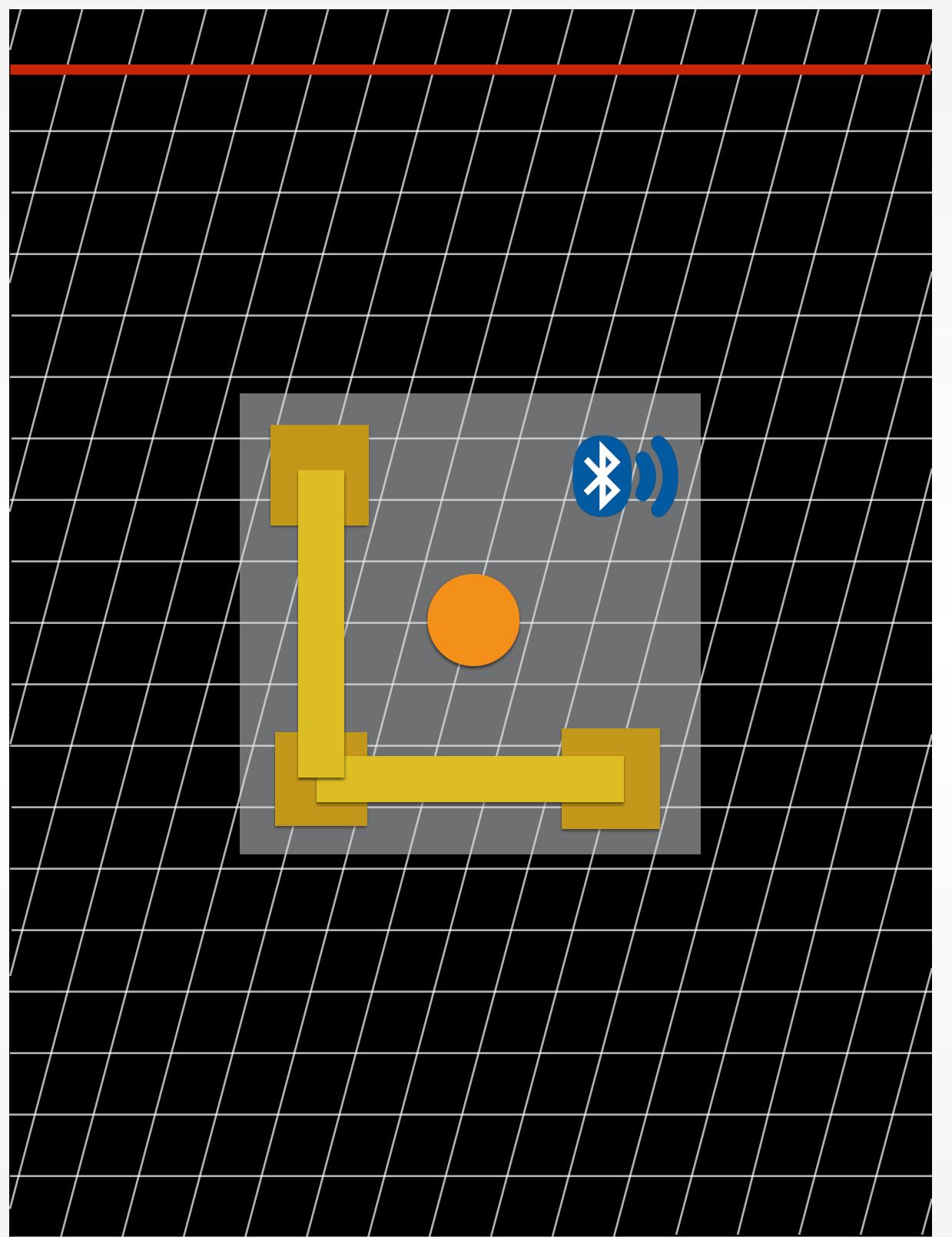


Scan line Signal

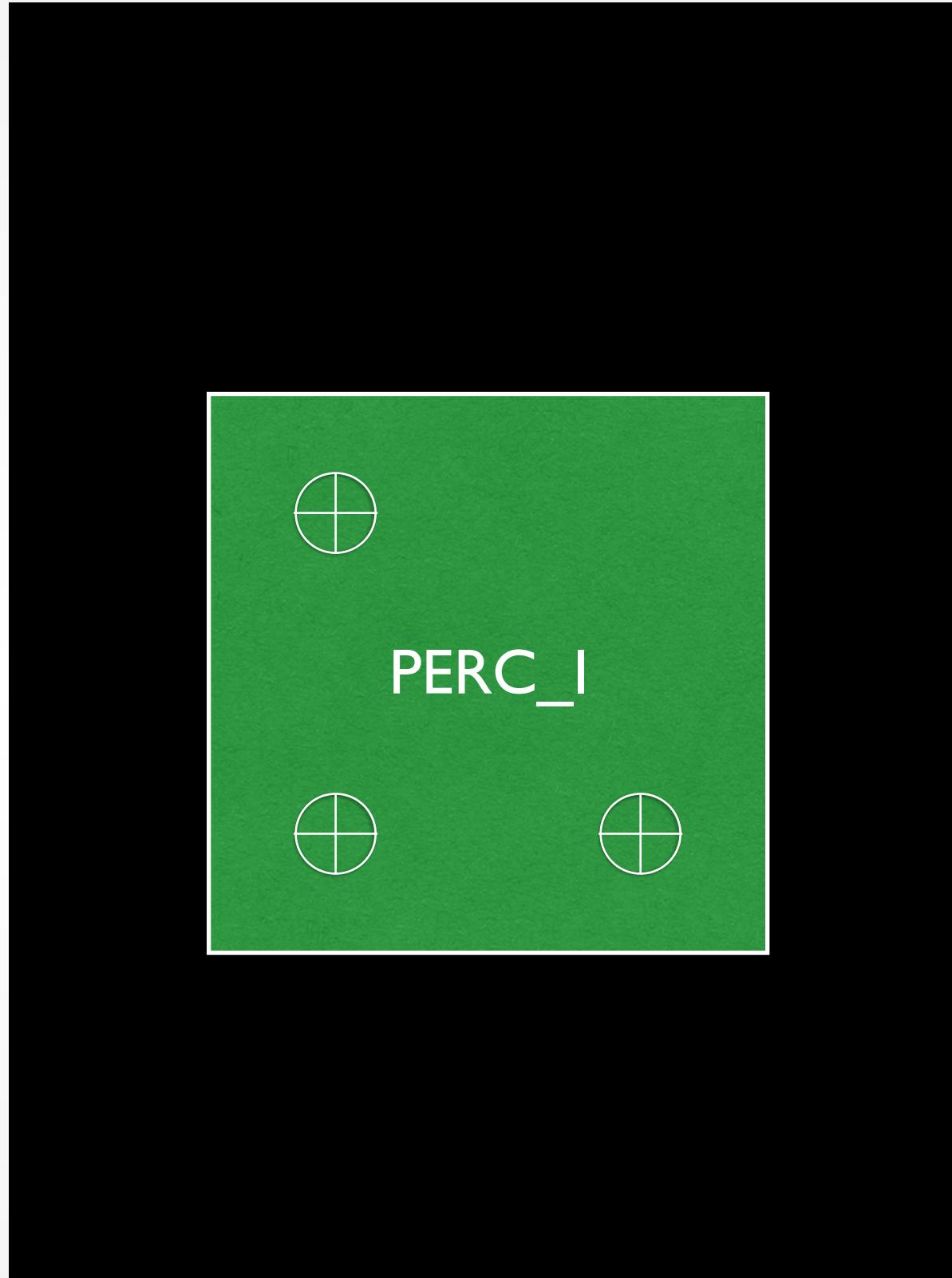


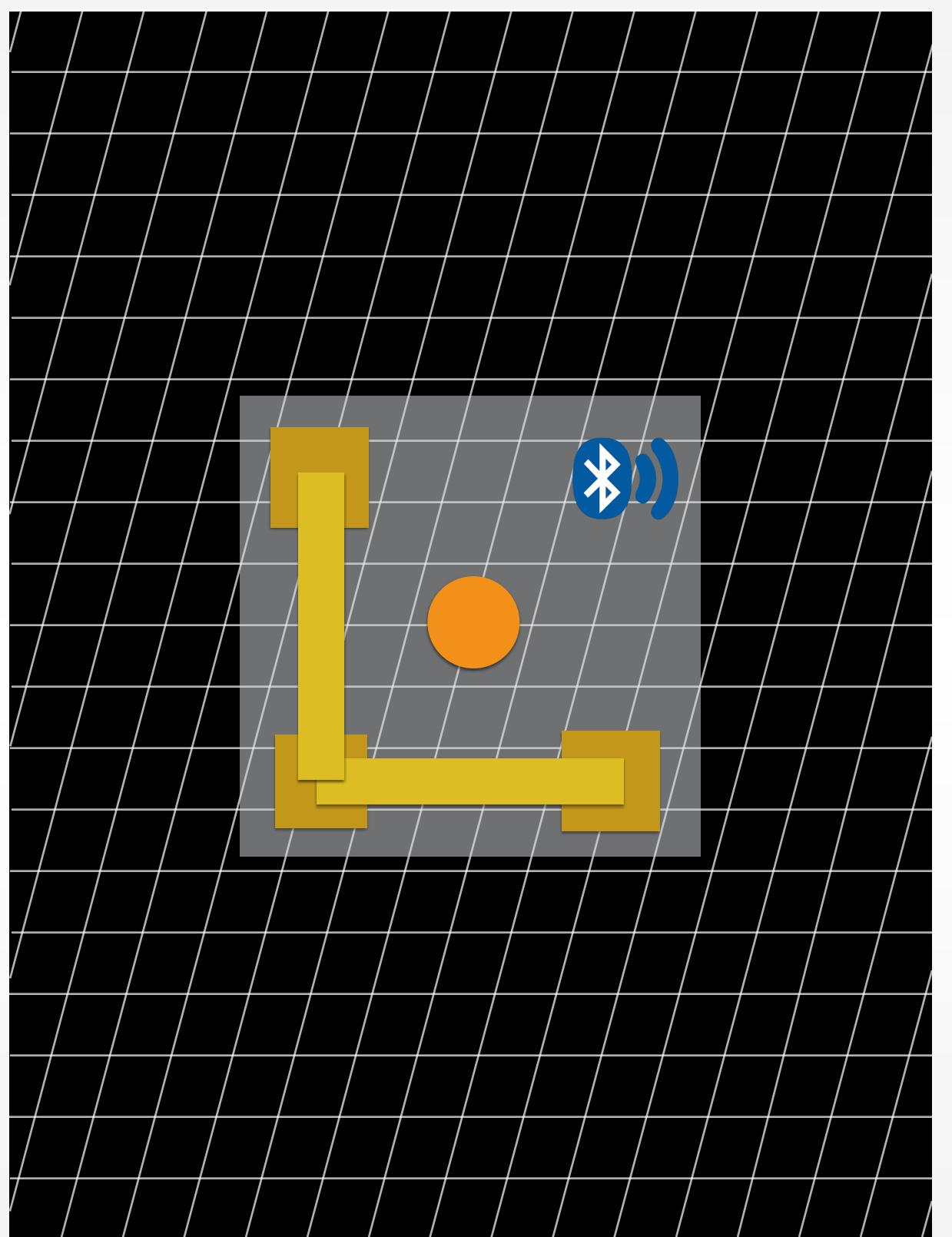
3M 46'' Display

Microsoft 55'' Display

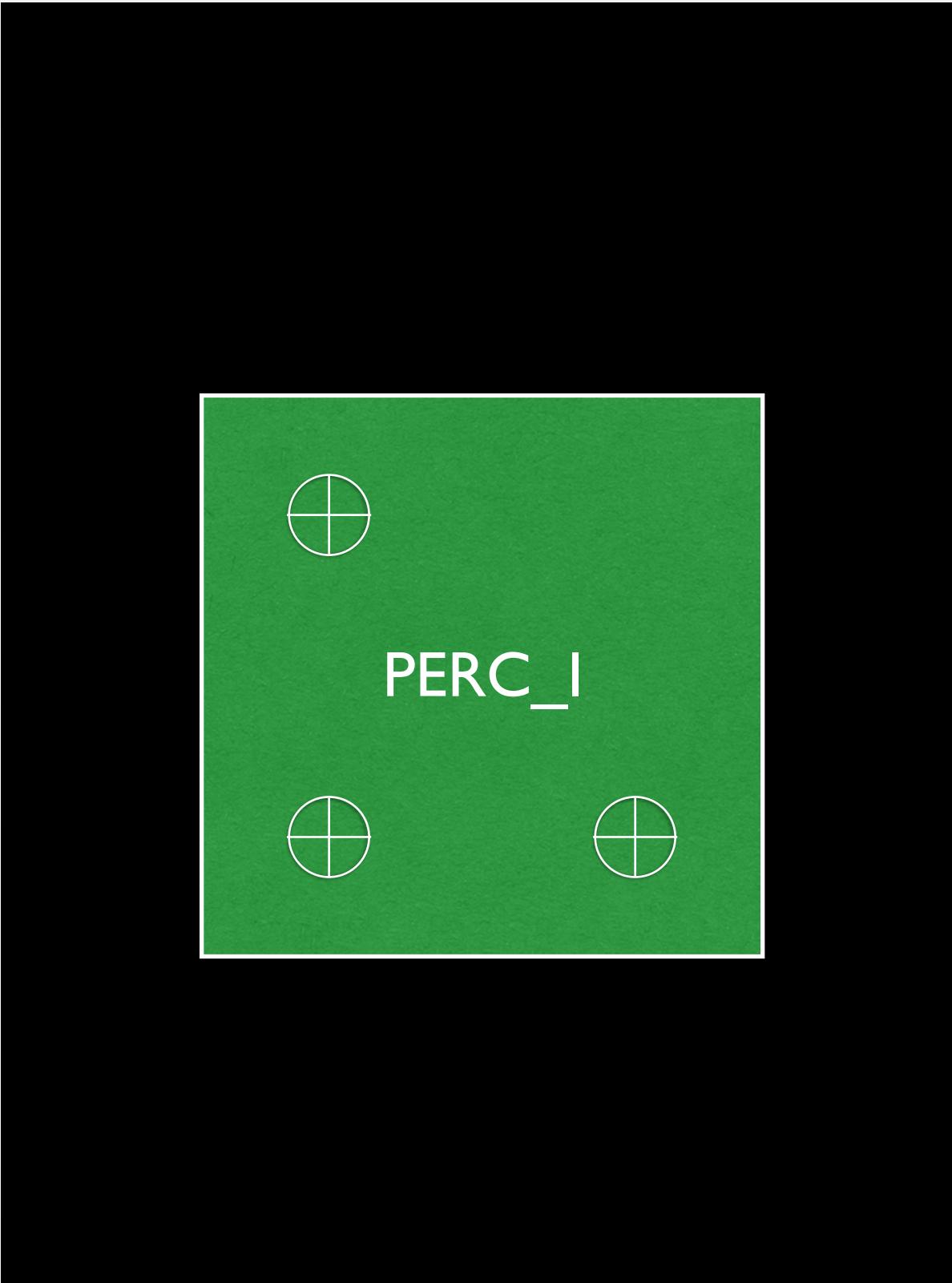


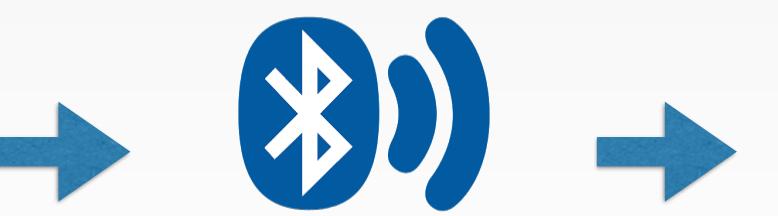
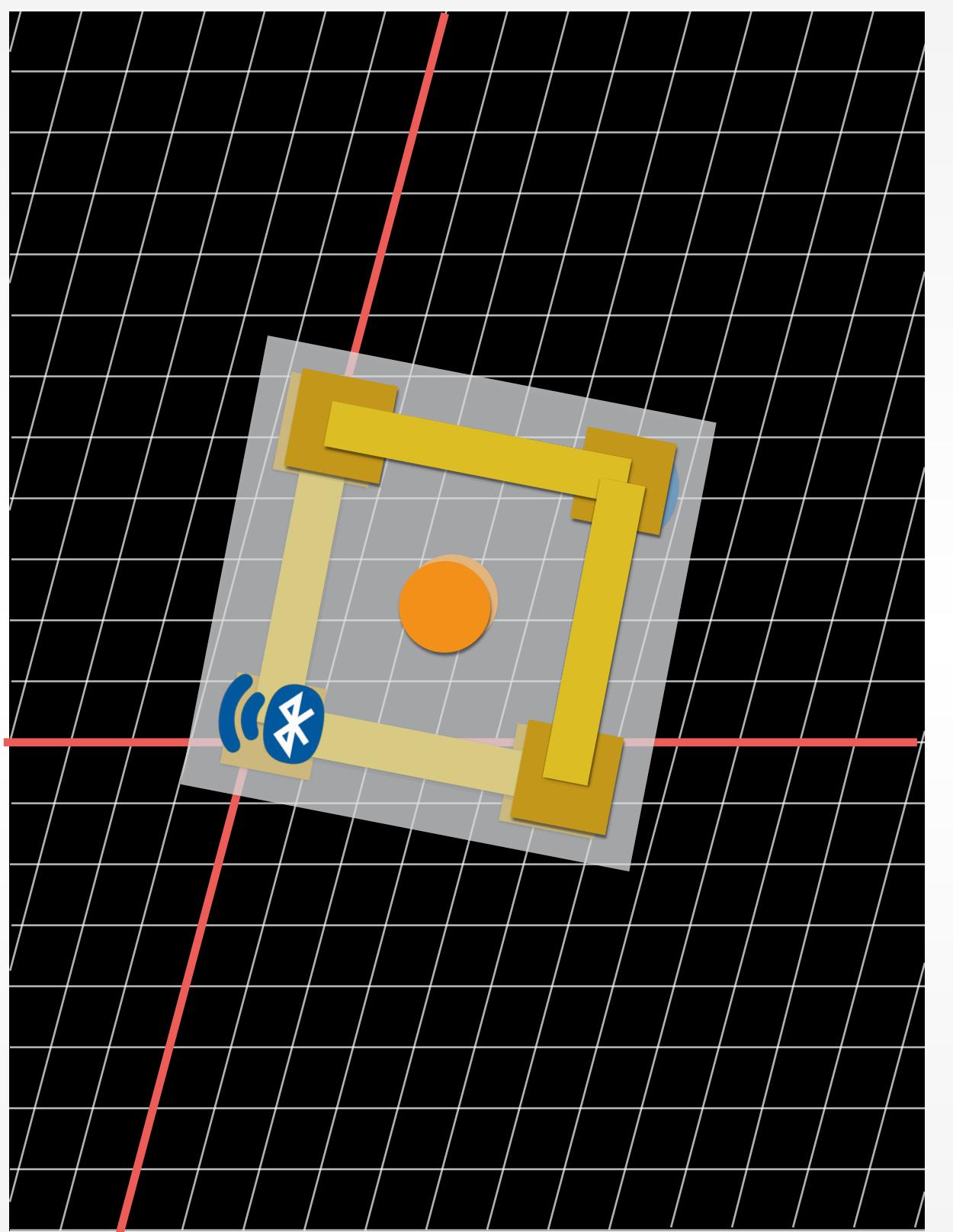
Tangible PERC_I **on** Surface



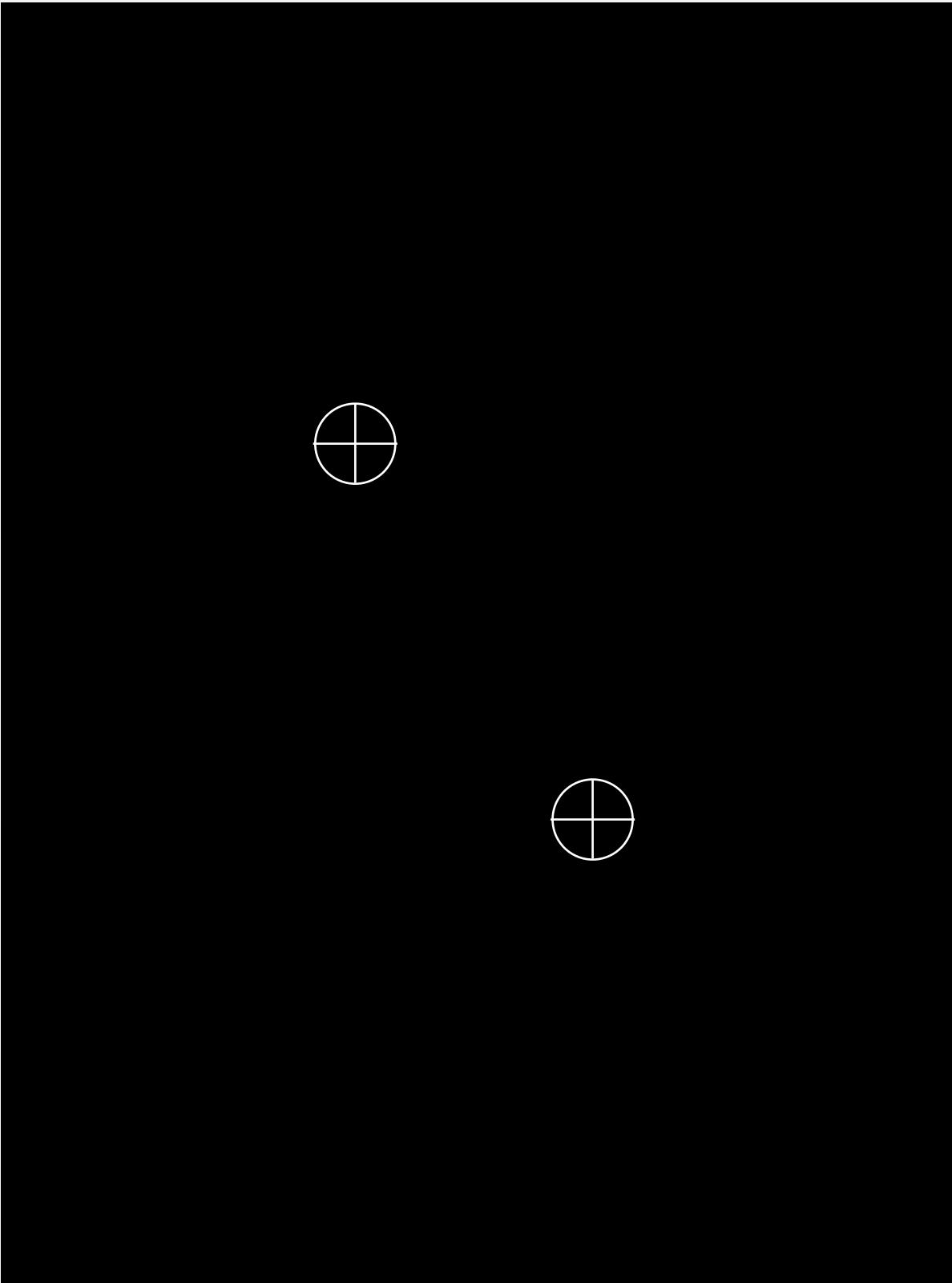


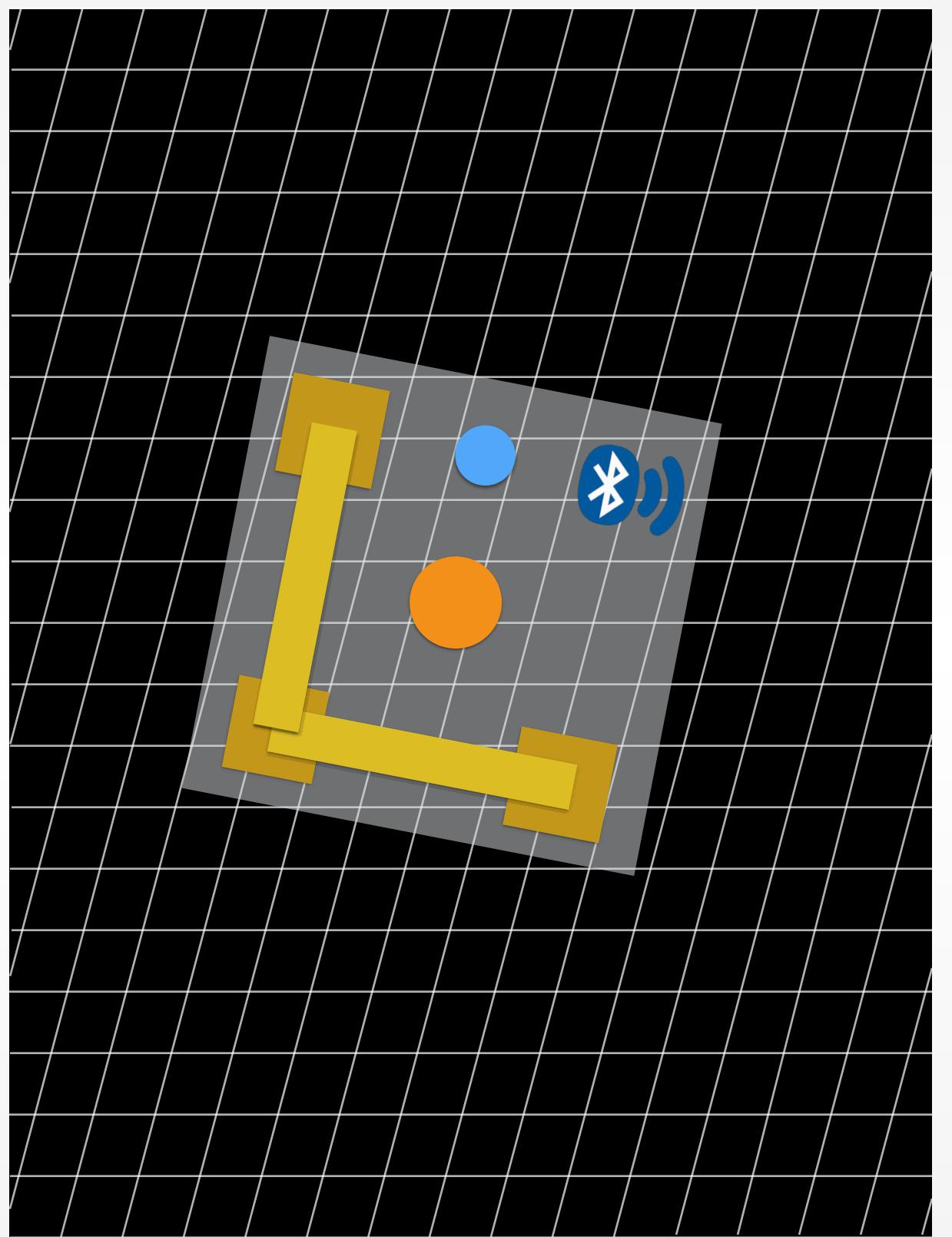
Tangible PERC_I **off** Surface



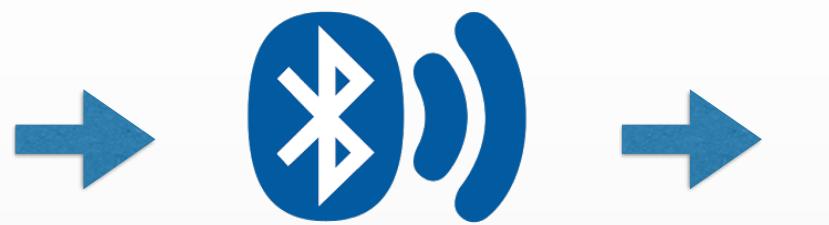


Tangible PERC_I **on** Surface

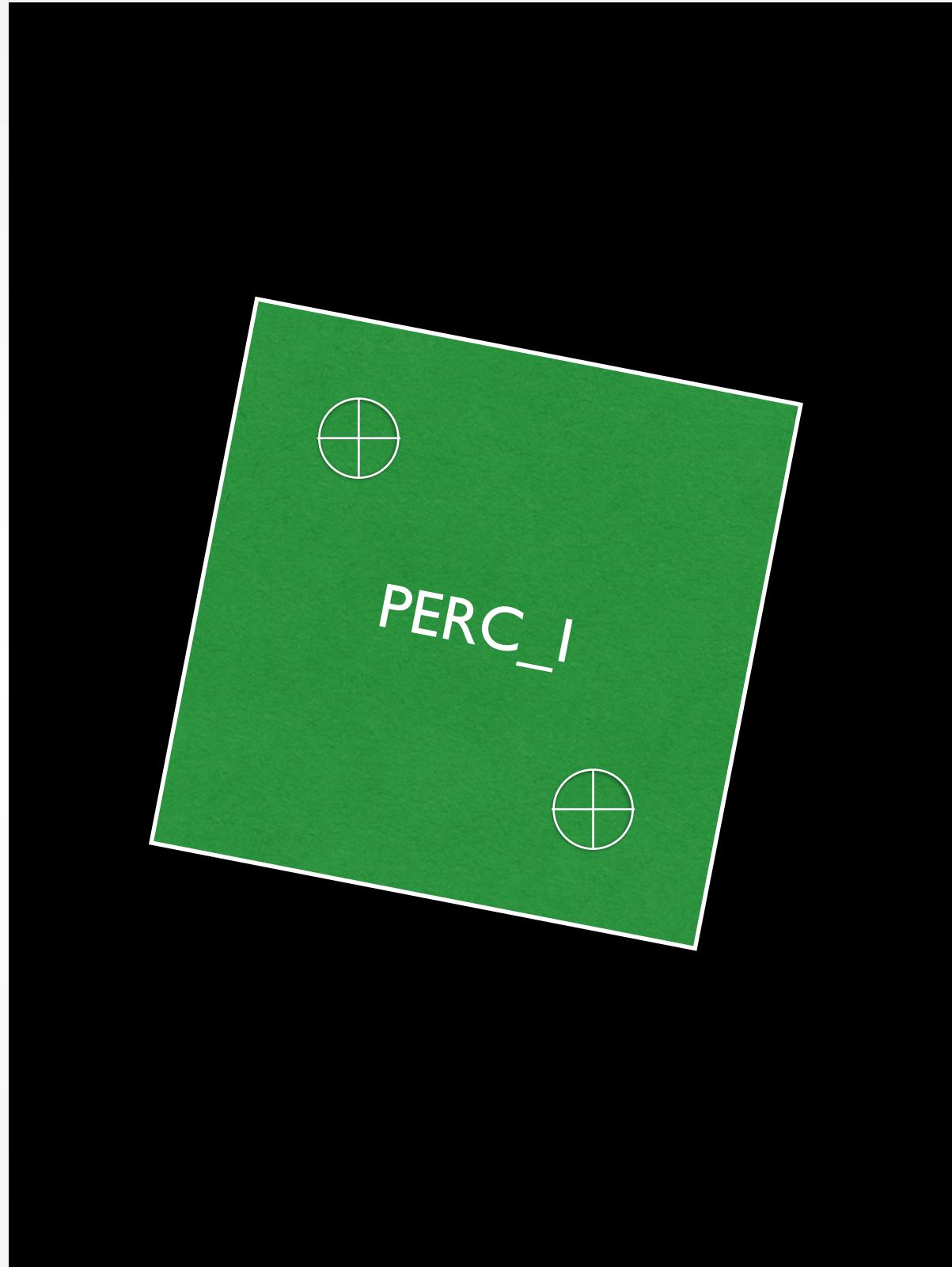


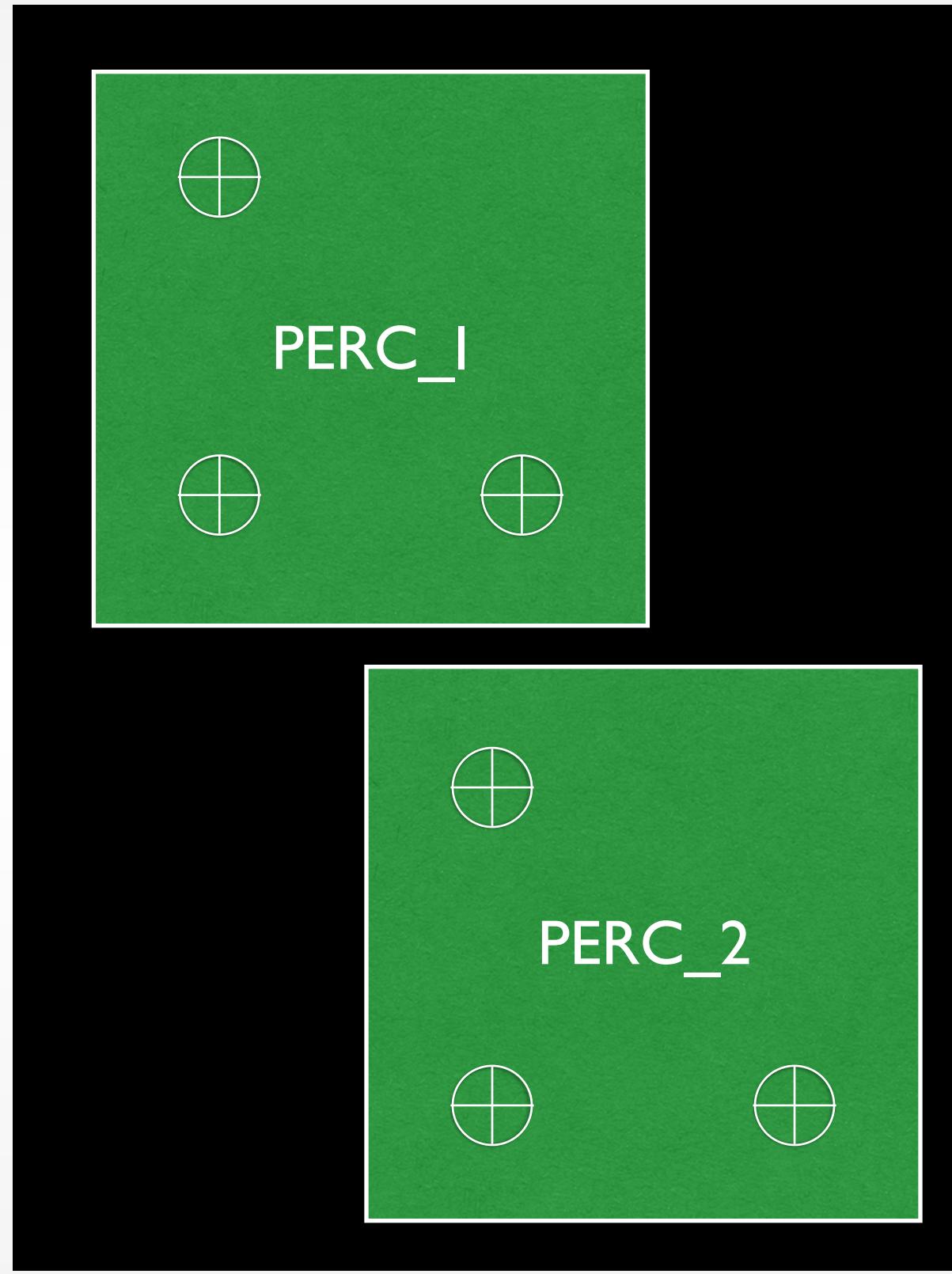
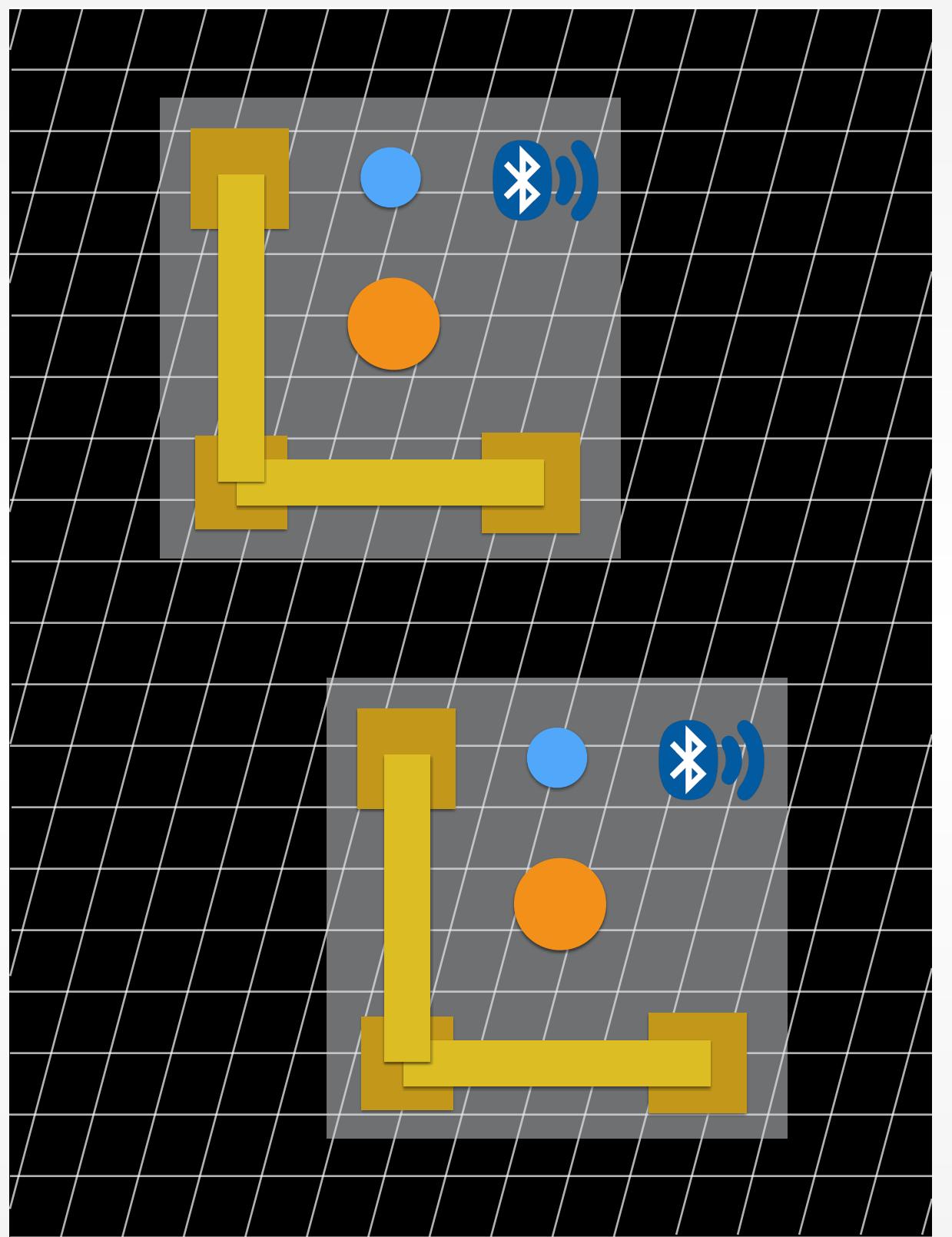


Tangible PERC_I **on** Surface



Color changed





Summary

- Tangibles on Tabletops
 - On optical systems
 - Passive on capacitive systems
 - Active on capacitive systems

