Moving Planar Catoms
Electromagnetic Prototype Modules for Claytronics
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- 2D cross-sections of 3D spherical catoms
- Enable us to study using electromagnets for cooperative movement
- Latest revision adds IR communication, plus magnet robustness to go >360°
- What limits us from scaling down? 1) electronics size, 2) magnet fabrication

Locomotion Through Coordinated Magnetic Fields
- Neighbor’s cooperation required to move
- All catom movement is relative – with only 2 catoms each spins an equal/opposite angle
- With more catoms, a rotor catom will move across the (mostly) stationary ensemble

Energizing close but not yet touching electromagnets with opposite fields (north, south) creates a powerful attractive force

Movement in a Larger Group of Catoms
- Using high power induces relative locomotion between a pair of catoms
- ...but by also using low power the ensemble can hold itself together
- Catom rolls relative to the ensemble into its new position

Successes
- Moving robots without moving parts
- Uninterrupted, complete rotation (>360°) of two catoms [new!]
- Bolt-together design for increased reliability [new!]
- IR communications hardware [new!]