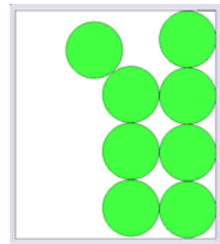
Macroscale Electromagnetic Catom Prototypes

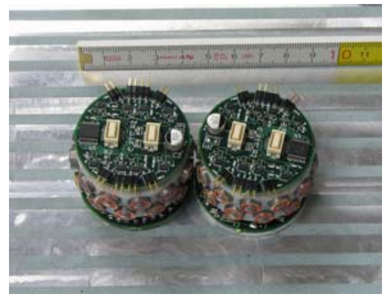
The cylindrical catoms we are building physically demonstrate several of the principles behind claytronics.

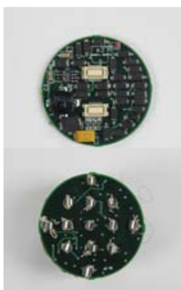


Relative Locomotion

Catom motion in our prototypes is achieved using electromagnets. By cooperatively energizing opposite pairs of magnet coils, catoms can move relative to one another.

While the present prototypes operate open-loop, we plan to use sensors eventually to provide distance and angle feedback for closed loop control.



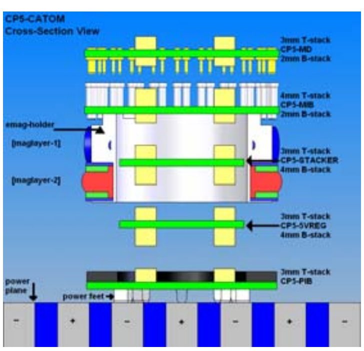


Power transfer

Our prototypes receive power from a tether or by rectifying DC from a power floor. For larger ensembles, cooperative systems are planned which will allow catoms to route power to each other via “virtual wires”.

Communications

The current prototypes are capable of wireless communications via wireless serial or bluetooth. Future microscale catoms will likely retain some form of wireless radio as a broadcast communications mechanism, but will rely on higher-bandwidth neighbor-to-neighbor communcation for most needs.



Modular Expansion

Modular connectors allow the addition of new modules (boards) to the prototypes. They also ease the process of circuit revision since functional components can be replaced without rebuilding the remainder of the catom. Add more computation as needed

The present stack of boards in use focuses on motion and rudimentary computation. Future efforts will add more computational capacity, a display, better communications, and a suite of sensors.

Research at Intel