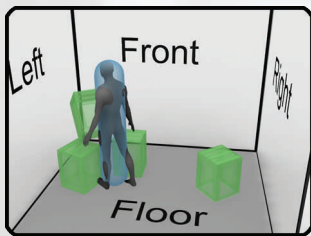
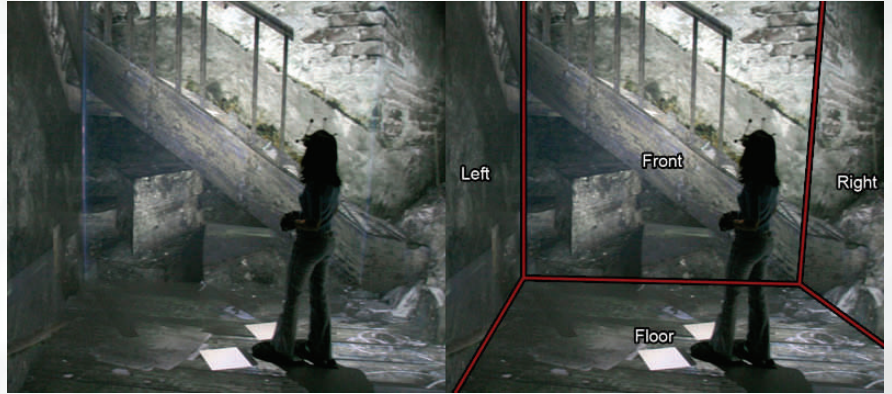


Physical Presence in a Virtual World

University of Michigan 3D Lab

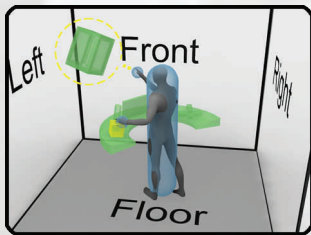
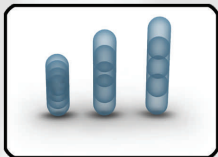
One of the biggest problems with interactive applications is how to suck the user into the experience, suspending their sense of disbelief so that they are completely immersed in the virtual world created for them. After receiving the extremely powerful SDK and accelerators from Ageia, we aimed to use this technology to bring the user one step closer to total immersion.

Since we wanted to create the most immersive and believable experience possible, we decided to initially develop for the CAVE. The CAVE is an advanced virtual reality system which consists of a 10'x10' room where each wall is a stereoscopic 3D screen similar to an IMAX theatre. Each wall is driven by its own dedicated computer with one master computer that tells each node what to draw and when. Combined with a Vicon motion capture system, we are able to track arbitrary objects within the CAVE allowing for several unique applications when coupled with PhysX and their supporting toolset.



Character Controller

- Uses real masses and physical properties through dynamic actors and multiple joints.
- Virtual objects can push user, user can push back
- Automatically resizes to users height allowing user to duck under objects or crawl into tight spots.
- User can freely move in CAVE affecting virtual world in the process.
- Can be easily extended to include distinct arms, legs, etc. that match the user's actual body.



Object Interaction

- User can pickup, throw, push objects using their hands which are tracked.
- Transfer of forces via kinematic actors on hands
- Sense of "feeling" the object's weight
- 3D user interface operated using triggers and the user's hands with arbitrary geometry/layout.

System Wide

- Perfectly synced physics across a cluster
- Stable, robust, and hardware accelerated
- No need for traditional input devices
- Geometry and physics art path: little or no programming needed



For more information, pictures, and examples we encourage you to have a look at the [associated paper](#).

