

# The MiniBooNE Detector

- on the trail of the elusive neutrino

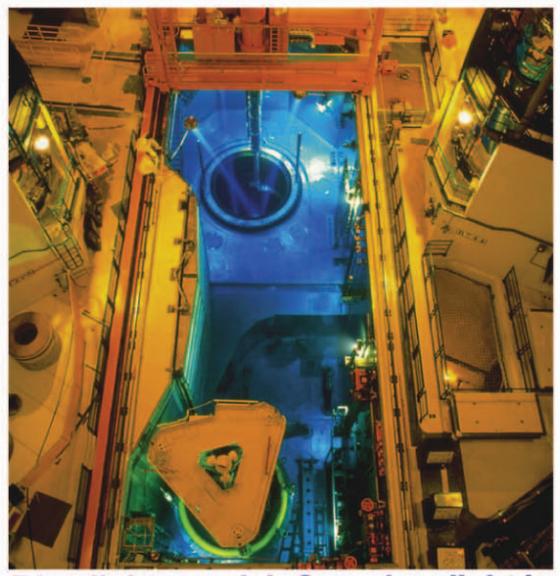
Nothing can move faster than light. Light itself, though, slows down when it travels through glass or water – or MiniBooNE's 250,000 gallons of ultra-clear mineral oil. When you look down at your toes in a swimming pool, your feet look closer, because light moves slower in water and the light rays bend.

This speed change is behind what is called Cerenkov light. When one of the neutrinos from the MiniBooNE beam line crashes into a particle in the mineral oil, charged particle products come zipping out. These speedsters, moving faster than the speed of light in the oil, produce a burst of blue light, a photon "shock wave" similar to a sonic boom.

The Cerenkov light bursts are very faint, so we use extremely sensitive photomultiplier tubes lining the walls of the MiniBooNE tank to detect and amplify them. The signals from the tubes fall into ring-shaped patterns, which can be analyzed to see where the neutrino interacted and what sorts of particles the collision produced.

- ♦ steel spherical tank 12 m (40 ft) in diameter
- ♦ filled with 250,000 gallons (800 tons) of ultrapure mineral oil
- ♦ lined with 1520 8-inch diameter Hamamatsu photomultiplier tubes
- ♦ 30 miles of cables from tank to electronics crates

**MiniBooNE detector  
in a nutshell**



Blue light special: Cerenkov light in the water around a nuclear reactor

