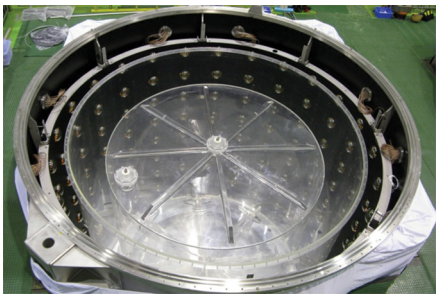
FOR IMMEDIATE RELEASE
May 15, 2012

Reynolds Polymer Technology Assists University of Wisconsin and the International Daya Bay Collaboration Find New Neutrino Transformation

R-Cast® acrylic cylinders from Reynolds Polymer Technology, Inc. allow highly sensitive photosensors to clearly read everything that the team measures. The result – the scientists became the first ever to measure a very elusive neutrino in a very short amount of time.

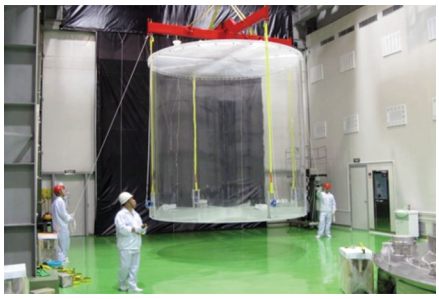
Hong Kong – The search for elusive neutrinos outside of a nuclear power complex in China achieved unexpected early success utilizing a design requiring R-Cast® acrylic cylinders from Reynolds Polymer Technology, Inc. (RPT). In only two months of data taking in the field and with only two-thirds of the acrylic cylinders up and running, scientists measured for the first time ever one of the key descriptors of the neutrino's elusive behavior.



Shown here is one of the R-Cast® acrylic cylinders sitting in a steel tank with the PMT photosensors lining the outer metal cylinder.
- photo courtesy Daya Bay Collaboration

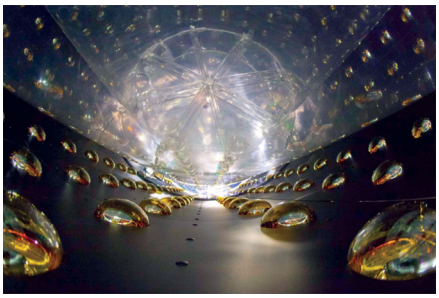
"We were certainly surprised how fast we made the first measurement," explained Karsten Heeger, University of Wisconsin-Madison physics professor and U.S. manager for the Daya Bay project. "It turns [out] this neutrino oscillation probability we measured was much bigger than expected. After only a couple of weeks of data taking with detectors a mile away from the nuclear power plant we started seeing a disappearance effect."

RPT assisted in the development of eight custom-designed precision R-Cast® acrylic tanks that allow scientists from the University of Wisconsin-Madison and the Daya Bay Collaboration in China to detect antineutrinos called Theta-13 (pronounced theta-one-three) from a nuclear power plant outside of Hong Kong. The R-Cast® acrylic cylindrical tanks measure 13 feet tall, 13 feet in diameter, 0.75 inches thick and form the inner center of the antineutrino detectors resting inside a larger steel chamber with photomultiplier tube (PMT) light sensors. The entire assembly sits in pairs in pools of ultrapure water to shield the antineutrino detectors from environmental interference.



Workers move one of the R-Cast® acrylic cylinders in one of the underground experimental halls. The 13-foot diameter cylinder will be lowered into a steel tank as part of the assembly process to build the antineutrino detector.
- photo courtesy Daya Bay Collaboration

"It's exciting to be part of such an important discovery," said Roger R. Reynolds, III, CEO of RPT. "Knowing our R-Cast® acrylic cylinders played a role, however small in the scheme of things, in facilitating the team of scientists with their discovery is something we are proud and honored to be a part of."



A close-up view into the steel chamber shows the R-Cast acrylic cylinder's proximity to the PMT light sensors. The acrylic is compatible with the fluids that will fill the chamber.
- photo courtesy Daya Bay Collaboration

Heeger's team selected R-Cast® acrylic for this project because acrylic, in general, is compatible with the scintillating fluids that fill the detectors and that make up the target medium for the experiment. "When neutrinos interact in the detector they produce little flashes," explained Heeger. "The acrylic vessels allow the light to pass through so that it can be detected with highly sensitive photosensors outside the vessels."

Known as a mixing angle, Theta-13 describes the probability that an electron antineutrino will change into another type of antineutrino. This measurement answers a longstanding question as to how the elusive particles called neutrinos can appear to vanish as they travel through space, even over a relatively short distance of just one mile.

Heeger went on to explain that this measurement is an important milestone in understanding why we live in a universe made up of matter and not antimatter. Neutrinos are elementary particles essentially moving at the speed of light. These particles have been around since the beginning of time and continue to be produced in nuclear reactions such as inside a nuclear power plant. "It turns [out that] neutrinos may hold the clue why the world we live in is made up of matter," said Heeger.

The Daya Bay experiment built tanks at the China Guangdong Nuclear Power Group power plant which has six reactors. It is among the top 5 most powerful reactor complexes in the world. The antineutrino detectors are located in three underground experimental halls specifically built for this experiment under a mountain. The detectors sit at varying distances from the power plant so that the team can detect the transformation of one kind of neutrino into another as a function of distance from the power plant.

Contact : Julie Hober, Marketing Manager | Reynolds Polymer Technology, Inc. | 970.241.4700

# # #