

Fermilab documenting construction of NOvA—next generation neutrino experiment (w/ video)

February 3 2014, by Bob Yirka



The NOvA experiment uses two detectors: a 222 metric-ton near detector at Fermilab and a much larger 15 metric-kiloton far detector (pictured here) in Minnesota just south of the U.S.-Canada border.

(Phys.org) —Fermilab, run by the U.S. Department of Energy is going to great lengths to document and make known the work that is being done to build the country's next generation neutrino experiment—a twin campus endeavor known as NOvA that will shoot neutrino's from one site to another located over 500 miles apart.

Neutrinos are [subatomic particles](#), electrically neutral and still rather mysterious. Scientists believe that studying them may help lead to fully understanding what everything in the universe is ultimately made of—may [physicists](#) believe that unlike other particles, neutrinos don't get their mass from the famous Higgs boson . Another unique thing about neutrinos is that they don't interact much with other regular matter, instead they tend to pass right through it—billions of them are passing through each of us every second.

To better understand neutrinos, researchers would like to know what happens to them as they travel, that's what's behind NOvA—a project that has an international team of physicists, engineers, technicians and even students building a massive two part experiment. The first part is essentially a neutrino gun—located in Batavia, Illinois—it will create neutrinos and fire them at the second site located in Ash River, Minnesota—it's over 500 miles away which means the [neutrino beam](#) will have to travel through portions of the Earth to get there. Upon arrival, the [neutrinos](#) will be captured by a very large (14,000 ton) piece of plastic that has been fashioned into liquid filled chambers, each with neutrino detecting gear.

By all measures it's a massive project, and Fermilab clearly wants the public to know where its tax dollars are being spent. They've hired video professionals to not only document the construction of the two facilities, but to interview many of the people involved in the effort, from physicists, to site managers to students volunteering to help.

In documenting the project, Fermilab is opening a window into the vast network of people and processes that are needed to undertake building a modern physics research facility. It also helps explain why it's so expensive, even when there is a lot of free labor provided by students.

The basic equipment at both sites is expected to be completed and

installed sometime this spring—the electronics will be put in later this summer.



Scientists will detect a small fraction of the neutrinos in a near-detector at Fermilab and in a larger far-detector in Minnesota looking for signals that the neutrinos are changing from one type to another on their trip.

More information: www-nova.fnal.gov/

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