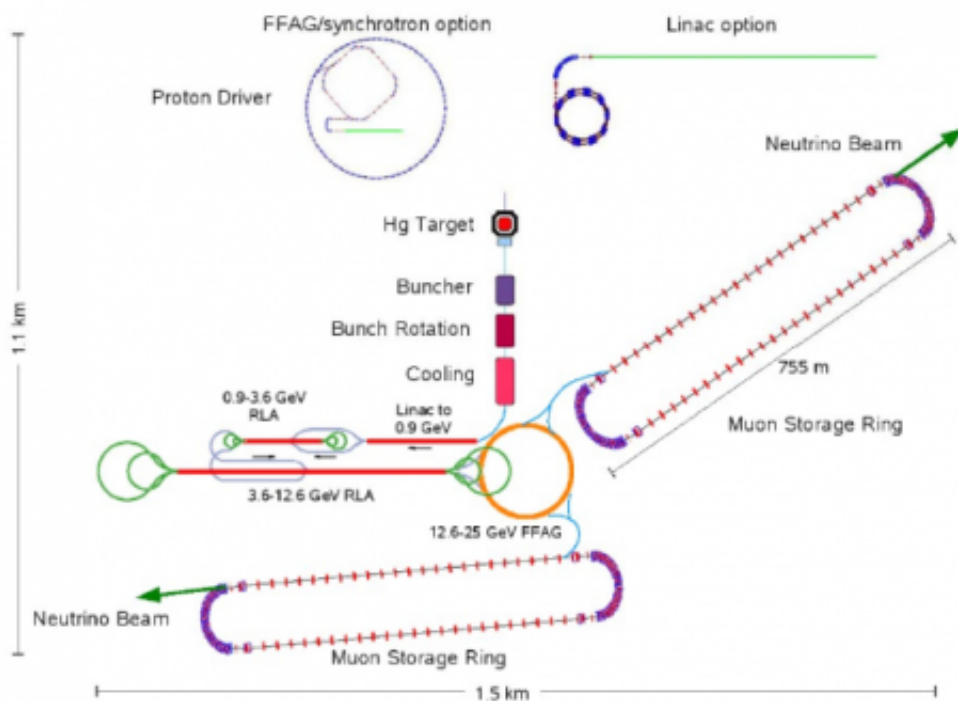


EUROnu project recommends building Neutrino Factory

June 19 2013, by Bob Yirka



(Phys.org) —The European Union's Seventh Framework Programme, EUROnu, has submitted its findings to a panel at CERN. Charged with choosing a project to study the nature of matter and antimatter, the project members have chosen one called the Neutrino Factory.

Members of the EUROnu project had winnowed down the options to

just three: the Neutrino Factory, Super Beam and Beta Beam. The Neutrino Factory option was the most costly—EUROnu projects its construction would cost between €4.6 billion and €6.5 billion.

In contrast to the Large Hadron Collider—its mission is to investigate the nature of gravity by looking at matters most basic [particles](#)—the [Neutrino Factory](#) would be a facility in which researchers seek to understand why matter exists in the first place. Specifically, it would help scientists understand why there are not equal amounts of matter and antimatter. Another question is, since [matter and antimatter](#) annihilate one another on contact, how was it the universe was able to form at all? EUROnu project members believe the Neutrino Factory would be the best way to find such answers.

Currently, the best approach to do so appears to lie with studying [neutrinos](#). The idea with the Neutrino Factory is to create neutrinos—by firing [protons](#) into an unmoving target, resulting in [muons](#) which in turn decay into neutrinos. Sending the neutrinos some distance and then studying how they've changed during transit, researchers believe, would help to better understand how they work. Noting changes in the proportions of the types of neutrinos sent, for example, could help scientists gain a deeper understanding of antimatter. To make that happen, the Neutrino Factory would actually have two main components. The first would be an emitter station to create the neutrinos and send them. The second would be a receiving station some distance away. Since neutrinos can travel through matter in a straight line, the Neutrino Factory would shoot them down through the Earth, where they would be picked up by the receiving station—from Switzerland to Japan for example.

The recommendation by EUROnu is just the first step in the development of the new project, of course, and there is no guarantee that it will ever be built at all. It's up to the EU to decide. The project could

also be changed to reduce costs or phased in to spread the cost over more years.

More information: hepunx.rl.ac.uk/uknf/
[www.nu.to.infn.it/Neutrino Factory/](http://www.nu.to.infn.it/Neutrino_Factory/)

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