Solving Mysteries of, and with, the Neutrino

Ever since Pauli suggested the neutrino in 1930 to explain a discrepancy in the beta decay spectrum this lightest of all matter particles has not failed to surprise. Pauli thought it may never be detected but it was in the 1950's and in the 1960's it was realised that more than one kind existed. A discrepancy with the detected number of neutrinos from the sun, the solar problem, was only solved when it was clear that the description of the neutrino in the highly successful Standard Model was incorrect. To further establish its properties highly complex experiments are now being proposed, one of which could see neutrinos artificially produced in Europe being detected in India and the Arctic after travelling thousands of kilometres through the earth. Such projects are ambitious, but 80 years on the surprises continue and this ubiquitous particle is one of the best hopes for clues to the ultimate particle theory, the matter dominated universe, supernovae, dark matter and ?