

Neutrino Communications

Consider how neutrinos can be used to communicate digital information across the globe.

Focus: Neutrino beams, oscillations

Requirements: analytical and numerical calculations

Author: Joe Formaggio

There is considerable incentive to substitute conventional means of communications (photons) with neutrinos, as neutrinos enable a direct point-to-point access for communication without needing to relay signals across satellites. Even a slight advantage in relay times or access to remote locations is highly desirable for financial trading or submarine communications.

Consider the possibility of a direct neutrino beam communication line from New York to Tokyo. What advantages would emerge over conventional communications? What beam energies/neutrino sources could one consider?

The use of neutrino beams also opens the possibility of leveraging entangled bits through the mechanism of neutrino oscillations. How would one structure the neutrino beam to take advantage of this feature?