

## Quantum Physics

# Neutrino oscillations with a polarized laser beam: an analogical demonstration experiment

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The underlying physics of neutrino oscillation in vacuum can be demonstrated by an optical analogical experiment. Two different neutrino flavors are represented by two polarization states of a laser beam, whereas the different phase propagation in vacuum is mimicked by the propagation difference of an ordinary and an extraordinary beam in a birefringent crystal. This allows us to demonstrate neutrino oscillation by optical methods in a fully microscopic way at the particle level. The description of both realizations of oscillation is also mathematically identical. In our demonstration experiment we can vary the oscillation parameters such as propagation length  $L$  and mixing angle  $\Theta$ .

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