

# Solvay Colloquium

**Professor Alexei Smirnov**  
MPIK Heidelberg, Germany



## Oscillations, no-oscillations and neutrino mass

The Nobel prize in physics 2015 has been awarded "... for the discovery of neutrino oscillations". In this connection I will describe the SuperKamiokande (SK) and SNO experiments and give the present day interpretation of their results.

While SK has discovered vacuum oscillations, the SNO observed mainly effect of the adiabatic flavor conversion in matter of the Sun with only small corrections due to the averaged oscillations. In general, oscillations imply existence of mixing but not a mass. Further studies required to show that the neutrino masses are behind the SK and SNO observations.

In continuation I will discuss the present status of exploration of the solar neutrinos as well as oscillations of neutrinos of various origins. Some recent developments of the theory of neutrino oscillations in vacuum and in different media will be outlined. That includes, in particular, effects of spread of the neutrino wave packets, splitting of eigenstates in multilayer media, collective oscillations related to scattering of neutrinos on neutrinos.

**Tuesday 26 January 2016 at 4.00 P.M.**

COFFEE AND TEA WILL BE SERVED AT 3.45 P.M. IN FRONT OF THE SOLVAY ROOM

### SOLVAY ROOM

BUILDING N.O. - 5TH FLOOR  
UNIVERSITÉ LIBRE DE BRUXELLES  
CAMPUS PLAINE - BOULEVARD DU TRIOMPHE  
ACCESS 2- 1050 BRUSSELS