ID contributo: **196** Tipo: **Poster**

Super-light sterile neutrinos at Borexino and KamLAND

martedì 18 giugno 2024 17:30 (2 ore)

The presence of a super-light sterile neutrino can lead to a dip in the survival probability of solar neutrinos, and explain the suppression of the upturn in the low energy solar neutrino data. In this work, we systematically study the survival probabilities in the 3+1 framework by taking into account of the non-adiabatic transitions and the coherence effect. We obtain an analytic equation that can predict the position of the dip. We also place constraints on the parameter space of sterile neutrinos by using the latest Borexino and KamLAND data. We find that the low and high energy neutrino data at Borexino are sensitive to different regions in the sterile neutrino parameter space. In the case with only θ_{01} being nonzero, the ^{8}B data sets the strongest bounds at $\Delta m^2_{01} \approx (1.1 \sim 2.2)\Delta m^2_{21}$, while the low energy neutrino data is more sensitive to other mass-squared regions. The lowest bounds on Δm^2_{01} from the pp data can reach 10^{-12} eV^2 because of the coherence effect. Also, due to the presence of non-adiabatic transitions, the bounds in the range of 10^{-9} eV^2
$lesssim \Delta m^2_{01}$
$lesssim 10^{-5}$ eV^2 become weaker as Δm^2_{01} or $\sin^2 2\theta_{01}$ decreases. We also find that in the case with only θ_{02} or θ_{03} being nonzero, the low energy solar neutrino data set similar but weaker bounds as compared to the case with only θ_{01} being nonzero. However, the bounds from the high energy solar data and the KamLAND data are largely affected by the sterile mixing angles.

Poster prize

No

Given name

Jiajun

Surname

Liao

First affiliation

Sun Yat-Sen University

Second affiliation

Institutional email

liaojiajun@mail.sysu.edu.cn

Gender

Male

Collaboration (if any)

Autore principale: LIAO, Jiajun (Sun Yat-sen University)

Relatore: LIAO, Jiajun (Sun Yat-sen University)

Classifica Sessioni: Poster session and reception 1

Classificazione della track: Sterile neutrinos