

# Understanding the Degenerate Solutions of NOvA

## Authorship annotation

## Session and Location

Wednesday Session, Poster Wall #85 (Auditorium Gallery Left)

## Abstract content

A combined analysis of disappearance and appearance data of NOvA experiment gives three nearly degenerate solutions. This degeneracy can be understood by the following argument: We first consider  $\nu_e$  appearance signal due to vacuum oscillations in the limit of maximal  $\theta_{23}$  and no CP-violation. We then calculate the deviations induced in the signal event rate by (a) matter effects (NH or IH), (b)  $\theta_{23}$  octance effects (HO or LO) and CP-violation ( $\delta_C = -\pi/2$  or  $\pi/2$ ). We find that the deviation caused by each of these effects is the same for NOvA. The three fold degeneracy arises because the data of NOvA is equal to the increase caused by two of the effects and the decrease caused by the third effect. We also find that further data by NOvA can not distinguish between these degenerate solutions but addition of one year of neutrino run of DUNE can make a distinction at  $3\sigma$  confidence level between all three solutions.

## Poster included in proceedings:

yes

**Primary author(s) :** Prof. UMASANKAR, Sankagiri (Indian Institute of Technology Bombay)

**Co-author(s) :** Dr. PRAKASH, Suprabh (Instituto de Fisica "Gleb Wataghin" - Unicamp); Mr. RAHAMAN, Ushak (Indian Institute of Technology Bombay); Mr. BHARTI, Suman (Indian Institute of Technology Bombay)

**Presenter(s) :** Prof. UMASANKAR, Sankagiri (Indian Institute of Technology Bombay)

**Session Classification :** Poster Session Wednesday

**Track Classification :** Poster (not participating in poster prize competition)