

DECLARATION BY THE CANDIDATE

I, Bichitra Bijay Boruah, hereby declare that the subject matter in this thesis entitled, "**Lepton number violation, lepton flavor violation and related cosmology in the light of latest neutrino and cosmology data**", is a presentation of my original research work. Whenever contributions of others are involved, every effort is made to indicate this clearly, with due reference to the literature and acknowledgment of collaborative research and discussions.

The work is original and has not been submitted earlier as a whole or in part for a degree or diploma at this or any other Institution or University.

This thesis is being submitted to the Tezpur University for the degree of Doctor of Philosophy in Physics.

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This is to certify that the thesis entitled "**Lepton number violation, lepton flavor violation and related cosmology in the light of latest neutrino and cosmology data**" submitted by **Mr Bichitra Bijay Boruah** to the School of Sciences of Tezpur University in partial fulfillment for the award of the degree of Doctor of Philosophy in Physics has been examined by us on...../...../..... and found to be satisfactory.

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Abbreviations

Abbreviation	Meaning
SM	Standard Model
CP	Charge-Parity
BSM	Beyond Standard Model
LHC	Large Hadron Collider
keV	Kilo Electron Volt
PMNS	Pontecorvo–Maki–Nakagawa–Sakata
CKM	Cabibbo–Kobayashi–Maskawa
MSW	Mikheyev-Smirnov-Wolfenstein
SAGE	Soviet–American Gallium Experiment
GALLEX	Gallium Experiment
GUT	Grand Unified Theory
KamLAND-Zen	Kamioka Liquid Scintillator Anti- Neutrino Detector-Xenon
LSND	Liquid Scintillator Neutrino Ditector
MiniBOONE	Mini Booster Neutrino Experiment
MINOS	Main Injector Neutrino Oscillation Search
BNL	Brookhaven national laboratory

TBM	Tri-bimaximal Mixing
HM	Hexagonal Mixing
GRM	Golden Ratio Mixing
WMAP	Wilkinson Mass Anisotropy Probe
eV	Electron Volt
TeV	Tera Electron Volt
VEV	Vacuum Expectation Value
NH	Normal Hierarchy
NO	Normal Ordering
IH	Inverted Hierarchy
IO	Inverted Ordering
B+L	Baryon+Lepton
CERN	European Organization for Nuclear Research
LEP	The Large Electron-Positron Collider
ISS	Inverse Seesaw
NDBD($0\beta\beta\nu$)	Neutrinoless double beta decay
DM	Dark Matter
BAU	Baryon Asymmetry of Universe
BBN	Big Bang Nucleosynthesis
CMB	Cosmic microwave background
LNV	Lepton Number Violation
LFV	Lepton Flavour Violation
DW	Dodelson-Widrow

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Dedicated to my Parents