

DECLARATION BY THE CANDIDATE

I, Abinash Medhi, hereby declare that the thesis “***EXPLORING THE EFFECTS OF SCALAR NON STANDARD INTERACTION IN NEUTRINO OSCILLATIONS AND ASSOCIATED DETECTOR SIMULATION & INSTRUMENTATION***” being submitted to the Department of Physics, Tezpur University under the School of Sciences in partial fulfillment for the award of the degree of Doctor of Philosophy in Physics. This is an original work carried out by me and it has not been previously considered for the award of any degree, diploma, associateship, fellowship or and other similar title or recognition from any University, Institute or other organization.

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This is to certify that the thesis entitled “**Exploring the Effects of Scalar Non Standard Interaction in Neutrino Oscillations and Associated Detector Simulation & Instrumentation**”, submitted to the School of Science, Tezpur University in partial fulfillment for the award of the degree of Doctor of Philosophy in Physics, is a record of research work carried out by **Mr. Abinash Medhi (PHP19101)** under my supervision and guidance.

All help received by him from various sources have been duly acknowledged.

No part of this thesis has been submitted elsewhere for award of any other degree.

Mr. Abinash is a highly motivated student and he has shown excellent dedication during the course of his thesis-work. I wish him all the best for his future endeavors.

Sincerely Yours,

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The external examiner and the members of the ODEC have recommended that the thesis is found suitable in the oral defense evaluation without further examination. The committee recommends the award of the doctoral degree to the candidate.

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Abbreviations

AGN	A ctive G alactic N uclei
BSM	B eyond the S tandard M odel
CC	C harge C urrent
CMB	C osmic M icrowave B ackground
CERN	The E uropean O rganization for N uclear R esearch
CKM	C abibbo K obayashi M askawa
CPT	C harge P arity T ime reversal
CP	C harge C onjugation P arity
DUNE	D eep U nderground N eutrino E xperiment
EFT	E ffective F ield T heory
eV	E lectron V olt
GALLEX	G ALLium E Xperiment
GRBs	G amma R ay B ursts
HK	H yper K amiokande
HO	H igher O ctant
ICARUS	I maging C osmic A nd R are U nderground S ignals
IH	I nverted H ierarchy
INO	I ndia-based N eutrino O bservatory
JUNO	J iangmen U nderground N eutrino O bservatory
KATRIN	K arlsruhe T ritium N eutrino E xperiment
KamLAND-Zen	K amioka L iquid S cintillator A nti- N eutrino D etector- X enon
keV	K ilo E lectron V olt
KGF	K olar G old F ield

LBL	L ong B aseline E xperiment
LHC	L arge H adron C ollider
LH	L eft H anded
LIV	L orentz I nvariance V iolation
LO	L igher O ctant
LSND	L iquid S cintillator N eutrino D etector
MiniBOONE	M ini B ooster N eutrino E xperiment
MINOS	M ain I njector N eutrino O scillation S earch
MSW	M ikheyev S mirnov W olfenstein
NSI	N on S tandard I nteraction
NC	N eutral C urrent
NH	N ormal H ierarchy
NOνA	NuMI O ff-axis ν_e A ppearance
NDBD/ $0\nu\beta\beta$	N eutrinoless D ouble B eta D ecay
PMNS	P ontecorvo M aki N akagawa S akata
POT	P roton- O n- T arget
RENO	R eactor E xperiment for N eutrino O scillation
RH	R ight H anded
RL	R esonant L eptogenesis
RPC	R esistive P late C hamber
SSM	S tandard S olar M odel
SAGE	S oviet A merican G allium E xperiment
SSB	S pontaneous S ymmetry B reaking
SM	S tandard M odel
Super-K	S uper K amiokande
SNO	S udbery N eutrino O bservatory
T2HK	T okai to H yper K amiokande
T2HKK	T okai to H yper K amiokande to K orea
T2K	T okai to K amioka
TeV	T era E lectron V olt

Dedicated to my Parents
(Harekrishna Medhi & Rina Medhi)

