THOMPSON RIVERS UNIVERSITY

Nucleon Decay Generator Validation

Jerin Roberts
August 30, 2014

Supervisors: Dr. Christine Kraus, Dr. Erica Caden
Locations: SNOLAB, Laurentian University

CONTENTS

LIST OF FIGURES

LIST OF TABLES

1 INTRODUCTION

The SNO+ experiment will be used to search for rare modes of radioactive decay. These modes which typically violate baryon and lepton number conservations, if discovered could help refine symmetry theories concerning the antimatter/matter asymmetries seen through the universe. The experiment is broken into two phases; water and scintillation phase. During scintillation phase SNO+ will search for the rare neutrino-less double beta decay. Linear Alkyl Benzene will be loaded at 0.5% with a tellurium isotope. During regular beta decay a electron and a neutrino are given off both which which take a portion of the released energy. This generates a spectrum of energies for the detected electrons. During a neutrino-less double beta decay the neutrinos interected and anilate each other leaving just a double electron emission. Since the neutrinos are never ejected the energy released is given complettly to the electrons which results in the descrete energy spectrum. SNO+ will search for this small yet detectable blip in the electron energy emission spectrum.

During the water phase SNO+ will search for rare invisible nucleon decay.

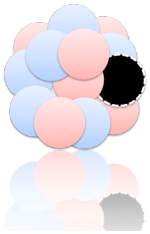

Figure 1.1: Displays the drive assembly component of the URM generated using FreeCAD 3D modeller.

REFERENCES

[Garcia, 2014] Lawrence Garcia (2014) Umbilical Tests and Detector Data Analysis

[Maneira, 2013] Jose Maneira, Rui Alves (2013) URM design for SNO+, LIP-Coimbra