Cross-section meassurements for $^{nat}Zn(n,p)64,67Cu$ reaction

by

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Abstract

hola

This is for me.

Acknowledgements

THANKS

Thank you grandmother, for being my safe place, even now.

Nora Irene Jensen Pettersen

DATO

Contents

Chapter 1

Introduction

"Count only the good days."

— Irene Jensen, Ahus 2017

Cancer. It can happen to us all, whether we like it or not. We all know someone or know someone who knows someone with cancer or had died of cancer. It sucks. But what if. What if there was a way to get rid of it? A tumor inside you, that grows without you knowing it. It can take years without you knowing it is there, and when you feel it, it might be too late. With regular radiation you will have that risk of radiate healthy cells and damage them, and over time they can become new cancer cells which can kill you all over again. That is why I want to look into this kind of radiation, where you radiate from the inside and out. Where you dont damage to many healthy cells but only the bad ones. This type of radiation can reach places in the body where regular radiation will not, in the brain and deep under the skin. A patient with brain tumor can not be radiated because that will also damage other part of the brain that the person needs, so why not send the radioactive molecule into the tumor itselfs? I would.

So im hoping, that this is my "what if".

A short introduction to nuclear medicine

Chapter 2

Theory

quote

— by,

2.1 Background of Nuclear medicine

- why does it work
- how how we been doing nuclear medicine
- what isotopes are we currently using in clinics
- problems with is
- my work

2.2 Radioactive decay

- what is it

2.3 Decay modes

-why are these usefull for nuclear medicine (therapy and diagnstics)

2.3.1 α-decay

2.3.2 β-decay

2.3.3 Electron capture, Internal convention and Auger electrons

2.3.4 γ-decay and X-rays

2.3.5 Theranostic

Chapter 3

Cu64,67

> *"- The idea that everyone is supposed to buy into stuff without questioning it, is the reason why we are 51 year old 16 year olds. - Dude, I agree. "*
>
> — Joe Rogan and Duncan Trussel

3.1 what can we do to make the nuclear medicine better?

-medical prespecctive: we wan to introduce a new theragnostic pairs to use in hospitals
- how wonderful Cu64,67 are
– properties
– papers
– better than a lot of the studff we are already using
– motivation for my work
—- can adjust ratio for 64,67 Cu by tuning the energy of the beam

3.1.1 My motivation

3.1.2 Physics motivation

- cu64,67 are amazin but now, we have not a good way for making them. tell about my way of create them
– deuterium breakup (n,-) way
– how we are doing it

Chapter 4

The experiment

quote

— by

4.1 The facility

- tuning of beam

4.2 Cyclotron

- k-value (descuss energies for hospital cyclotrons and what energies for Cu64,67), what is it, how does it work
- no more than a page or two (look at other theses o se how deep you should go)

4.3 Deuterium breakup prosess

- and how it is usefull for creating neutrons (brought energy spectrum that we can tune in terms of energy, inntense neutron source (makes a lot of neutrons) focused beam of neutrons
- moulders paper and other

4.4 Stack design

- photos and stuff
- monitor foils

4.4.1 Radiation

- how long time
- beam current
- beam monitor to meassure the
– plot the beam current as a function of time to justefy thet we can make the math that we do

4.4.2 Counting

- after each radiation, we removed the foils to the counting room (how long did this take?) hvor lang ti tok det fr vi begynte telle etter EOB?

4.5 Gamma spectroscopy

- Detector
– forklare hvor dypt jeg skal g inn i physics (doping, n-p junktion)
– pari production, comptopn og photoelectric effect

4.6 Gamma spectra

- deadtime, og alt det der

4.7 Calibrating

- detectror efficincy
- curves at different position

Chapter 5

Analyse

"If you ever start thinking too seriously, just remember that we are talking monkeys on an organic spaceship flying through the universe"

— Joe Rogan

5.1 Fitz peak

- Data to activity (the math). Peak counts to activity
- i - Aktivity to A_EOB
- Production physics (Analyse eller Resultater?) - how we calculate cross-sectrtion, the work with john to use the monitor data to neutron fluxes that Im going to use for calculate the cross section for my isotopes

5.1.1 Regression prosess

5.2 Priduction physics

Chapter 6

Results and dscussion

- Cross sections for all the isotopes
- experimentall data with the data that has been meassured so fare

6.1 TALYS

- tolking av resultat. Hvilke energier er best i forhold til hva vi ser?
- Verdien av dette i fremtiden?
- how can we desien target for kunne produsere mer Cu67. hvilke cyclotrons can we use for that?

Chapter 7

Summary and outlook

7.1 Future work

quote

— by