Cool Title

Oslo Cyclotron Laboratory

Project FYS-3180

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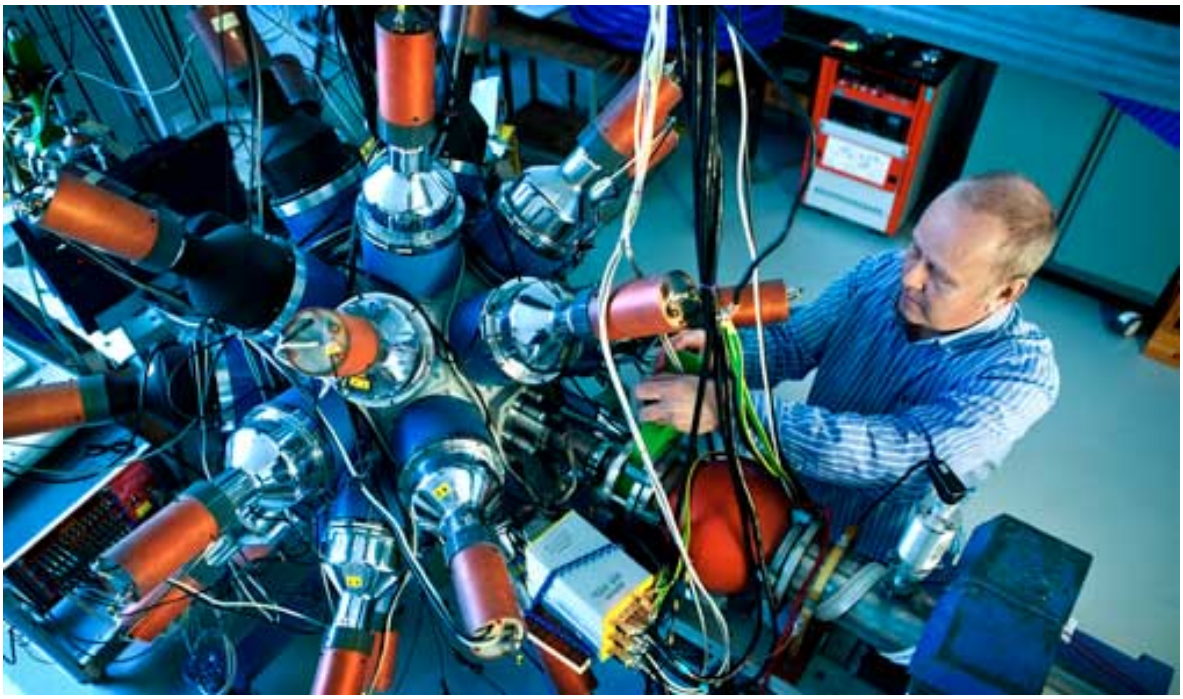

Figure 1: Magne Guttormsen working on the CACTUS/SiRi detector.

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1 Motivation and purpose

The purpose of this article is to give an (brief) introduction to detectors, systems and methods used in experimental nuclear physics. Important because blablabla learning about how to prepare and conduct an experiment and most importantly analyze and interpret the possible error sources.

Will give an short introduction to the OCL In this project we will focus on the basics of how the cyclotron works and

We will choose a particular reaction and prepare as for a real experiment by calculating (....energy lost in the ...kin...). We will then use data from an earlier experiment, analyse it and discuss possible error sources(?). Will also vertify/compare data with exsisting databases(?).

We will learn the terms: prompt time, particlebananas, thicknessspectra ++ (?)

2 How a general cyclotron works/the basic consepts of a cyclotron

A cyclotron is a particle accelerator for charged particles. The particles are accelerated with an external electric field and combined with a magnetic field the particles are contained in an orbit inside the cyclotron. A simple (or consept(?)) cyclotron consists of two half -cylinders placed side by side as in fig (?) Every time the particles pass between the two cylinders they are accelerated by an oscillating electric field. Inside the cylinders the electric field is zero, but there is a magnetic field perpendicular to the plane showed in figure (?) containing the particles in a circular orbit. The electric field changes direction for each half round of the particles and therefore increasing speed and radius. When the radius of the particle beam is bigger than the radius of the cylinders the particles leave the cyclotron.

The particles leave the syclotron with the desired energy (speed) so that they can be directed to a target. When the beam hit the target there are many ways of detecting the events. We will have a closer look at the specifics of the Oslo Cyclotron Laboratory and which sort of experiments that are possible.(daarlig setning...?)

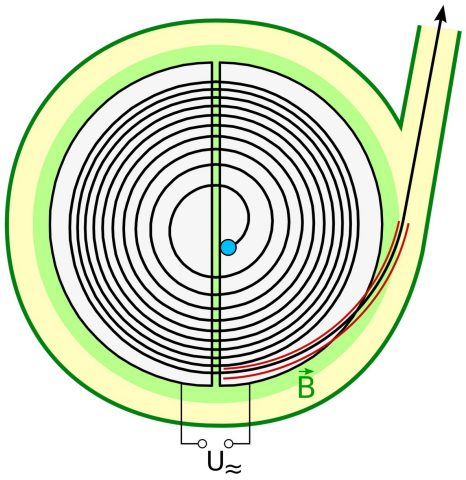

Figure 2: cyclotron copyright something.

3 The Oslo Cyclotron laboratory and the Oslo method(?)

The Oslo Cyclotron Laboratory (OCL) houses the only accelerator in Norway for ionized atoms in basic research[1]. The accelerator is used in various fields of research for instance nuclear physics and nuclear chemistry. Other applications for the Cyclotrone are the production of isotopes for nuclear medicine.

CACTUS/SiRi detector can be used to study particle-gamma coincidences.

The gamma radiation and particle(utsending) is measured with the CACTUS and SiRi detectors. The dataset consists of event files; large files where each measured parameter from each nuclear reaction is written down. There are millions of event files that have been analyzed and sorted out. —>possible to folllow the experiment back to the beginning and "see" what happened.

4 Choice of target/reaction (?)

Choose a reaction (Si) We will calculate the parameters that are important for the experiment (with software kin) We will use data from an earlier experiment.

spesifics: we are going to analyse data from a reaction which a 16MeV proton beam on a 28Si target . the goal is to get familiar with the experimental methods at OCL and the data analysis

[1]http://www.mn.uio.no/fysikk/english/research/about/infrastructure/OCL/index.html

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