The HOLMES experiment aims to directly measure the mass abundances of the odd mass Ho isotopes by measuring the electron capture decay spectrum. The goal is to determine the abundances of the odd mass Ho isotopes, which are known to be produced in the decay of the even mass Ho isotopes. The experiment is based on the use of microcalorimeters to measure the energy released in the electron capture decay process. The microcalorimeters are housed in a cryostat, and the decay events are detected by measuring the change in temperature of the detector. The data is then analyzed to determine the mass abundances of the odd mass Ho isotopes.

The ion implanter...

The main components of the ion implanter are:
- An ion source to produce high energy ions.
- A charge selection device to separate the ions of interest.
- A beam line to transport the ions to the target chamber.
- A target chamber to contain the target and focus the ions.
- A detector to measure the current of ions passing through.

The ion source...

An ion source is used to produce ions with the desired energy and charge. The ion source is typically a filament that is heated to emit ions into a vacuum chamber. The ions are then accelerated and focused to a beam that is directed to the target chamber.

The target chamber...

The target chamber is where the ion beam impinges on the target material. The target chamber is usually a high vacuum chamber with a target holder that can be rotated to expose different areas of the target to the ion beam. The target holder is usually made of a material that is transparent to the ion beam, such as a graphite or a boron nitride disk.

The sputter target...

A sputter target is a target that is created by sputtering a material with a beam of high energy ions. The sputter target is typically a disk of the material of interest, and it is placed in the target chamber. The ion beam is directed at the sputter target to create a layer of the material on the target holder.

Molecular plating...

Molecular plating is a technique used to deposit a thin film of a material onto a surface. The material is typically a gas that is adsorbed onto the surface and then reacted to form a thin film. The film can be deposited onto a variety of substrates, including metal, glass, and plastic.

Sintered target...

Sintered targets are used in the ion implanter to achieve specific properties. The sintered targets are typically made by pressing a powder of the material of interest and then heating it to a high temperature to sinter the powder into a dense material. The sintered target is then placed in the target chamber and exposed to the ion beam.

Coupled reduction on molecular plating...

Coupled reduction is a technique used to deposit a thin layer of a material on a substrate. The material is typically a metal that is reduced to form a thin layer. The reduction is typically achieved by using a chemical or an electrochemical process.

Implanter calibration...

The ion implanter is calibrated using a known ion source to determine the beam current and energy. The calibration is typically performed using a known ion source, such as a radioactive source or a stable isotope. The calibration is then used to determine the beam current and energy that is used in the actual implantation process.

Some results @165 a.m.u.:

- The results obtained in the HOLMES experiment are used to determine the mass abundances of the odd mass Ho isotopes. The results are compared to the expected abundances to determine the accuracy of the experiment.
- The results are also used to refine the models used to predict the abundances of the odd mass Ho isotopes.
- The results are used to determine the mass resolution of the HOLMES experiment.

The chemical processes remove all other species other than Ho, but it is not sufficient to remove all background sources: in particular, 160Ho beta decay can produce fake signal in the region of interest. For this reason a dedicated implantation / beam analysis system has been set up and commissioned in Genoa's laboratory.

The ion source.

An ion source is used to produce ions with the desired energy and charge. The ion source is typically a filament that is heated to emit ions into a vacuum chamber. The ions are then accelerated and focused to a beam that is directed to the target chamber.

The target chamber.

The target chamber is where the ion beam impinges on the target material. The target chamber is usually a high vacuum chamber with a target holder that can be rotated to expose different areas of the target to the ion beam. The target holder is usually made of a material that is transparent to the ion beam, such as a graphite or a boron nitride disk.

The sputter target.

A sputter target is a target that is created by sputtering a material with a beam of high energy ions. The sputter target is typically a disk of the material of interest, and it is placed in the target chamber. The ion beam is directed at the sputter target to create a layer of the material on the target holder.

Molecular plating.

Molecular plating is a technique used to deposit a thin film of a material onto a surface. The material is typically a gas that is adsorbed onto the surface and then reacted to form a thin film. The film can be deposited onto a variety of substrates, including metal, glass, and plastic.

Sintered target.

Sintered targets are used in the ion implanter to achieve specific properties. The sintered targets are typically made by pressing a powder of the material of interest and then heating it to a high temperature to sinter the powder into a dense material. The sintered target is then placed in the target chamber and exposed to the ion beam.

Coupled reduction on molecular plating.

Coupled reduction is a technique used to deposit a thin layer of a material on a substrate. The material is typically a metal that is reduced to form a thin layer. The reduction is typically achieved by using a chemical or an electrochemical process.

Implanter calibration.

The ion implanter is calibrated using a known ion source to determine the beam current and energy. The calibration is typically performed using a known ion source, such as a radioactive source or a stable isotope. The calibration is then used to determine the beam current and energy that is used in the actual implantation process.

Some results @165 a.m.u.:

- The results obtained in the HOLMES experiment are used to determine the mass abundances of the odd mass Ho isotopes. The results are compared to the expected abundances to determine the accuracy of the experiment.
- The results are also used to refine the models used to predict the abundances of the odd mass Ho isotopes.
- The results are used to determine the mass resolution of the HOLMES experiment.