# Development of the Position Sensitive Ionization Chamber for ANASEN

Hannah Gardiner

Dr. Jeff Blackmon

Motivation

◆ Understanding radioactive atoms helps explain several astrophysical events, such as novae and X-ray bursts.

◆ The **A**rray for **N**uclear **A**strophysics **S**tudies with **E**xotic **N**uclei (ANASEN) is a charged-particle detector array designed for direct radioactive ion beam measurements of reactions that are important in Type I X-ray bursts.
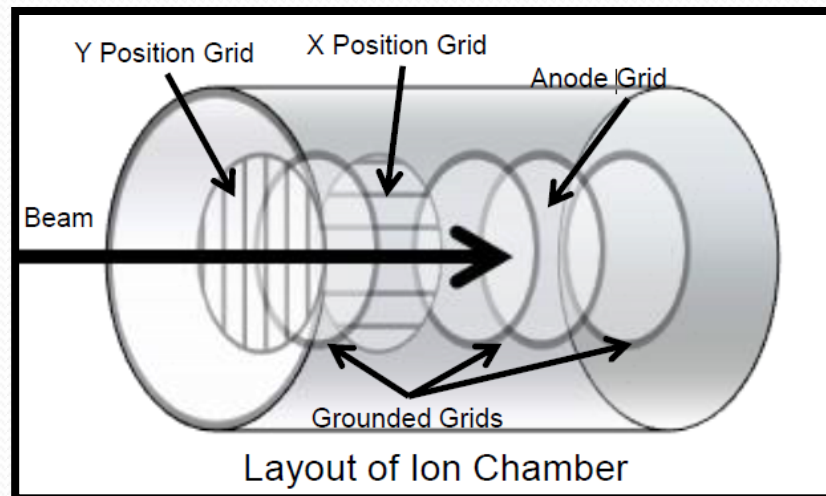
A Reaction of Interest

- O17(p,α)

Experimental reaction
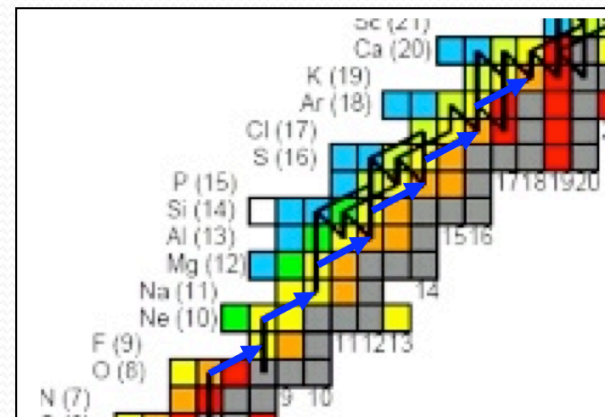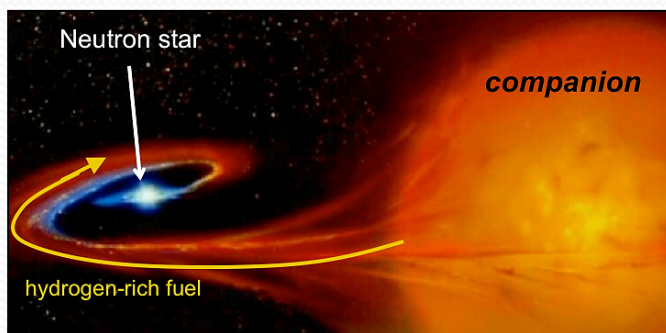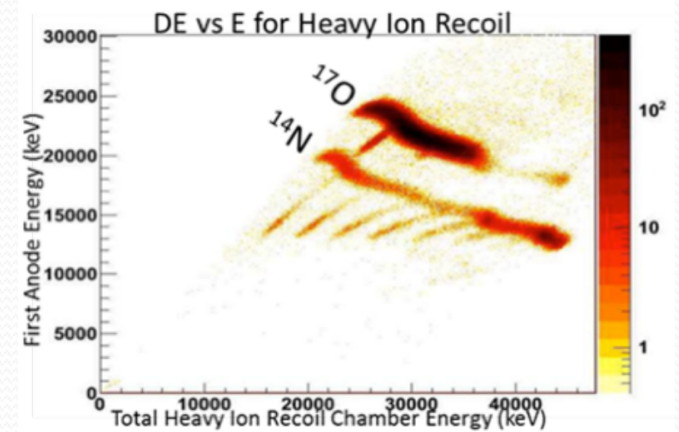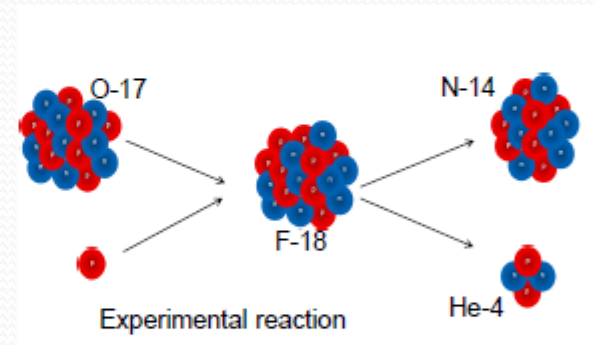
How the Ion Chamber Works

- Detecting and identifying heavier atoms selects the nuclear reactions of interest.
- The ion chamber consists of alternating anode/ cathode planes
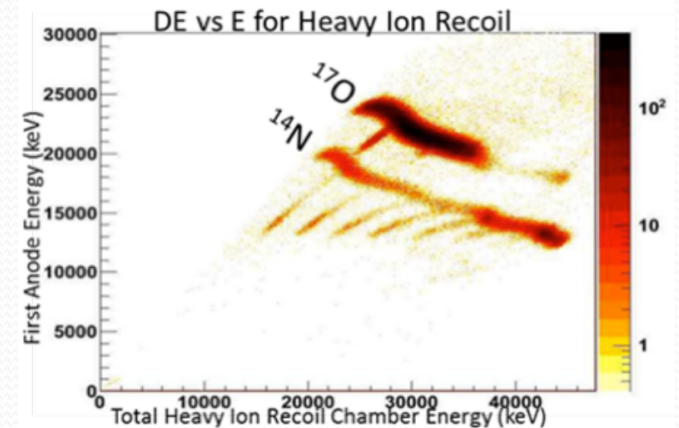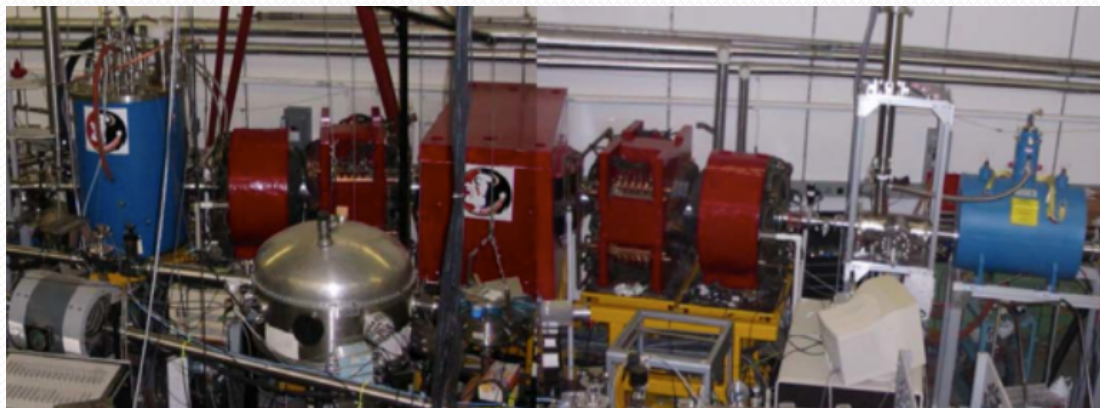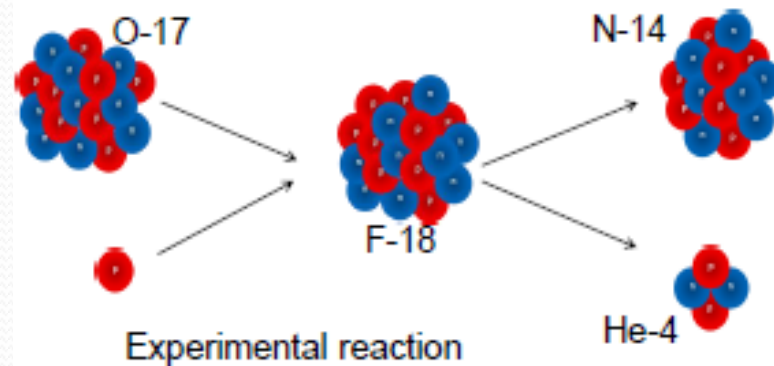

Layout of Ion Chamber

How the Ion Chamber Works Pt. 2

- The chamber is filled with an inert gas that is ionized as the heavier atoms move through it.
- High voltage wire planes within the chamber collect the ionized gas.

Layout of Ion Chamber
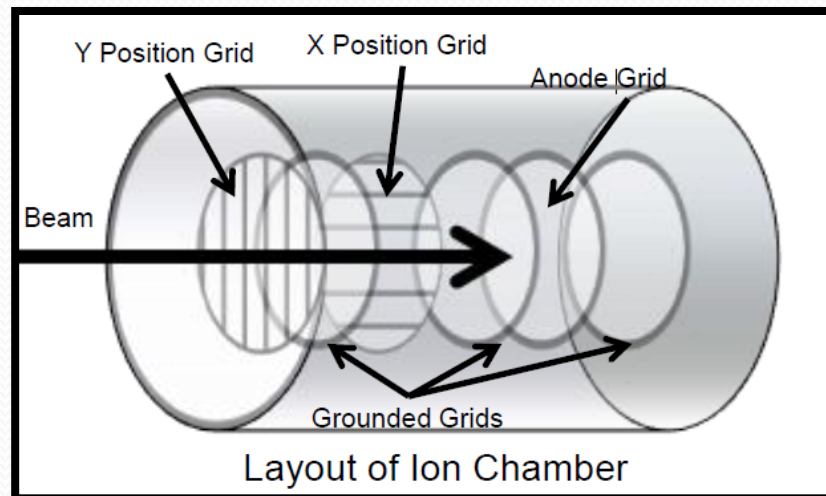
A Reaction of Interest

- O17(p,α)
- Fairly well described
- Good for comparing detectors


Experimental reaction

The New and Improved Detector

- Large acceptance
- Two wire plane circuit boards contain 32 signals each, giving 3 millimeter spacing resolution in the x and y directions.
- Track the path of ions as they move through the chamber.
- Alternating anode/cathode planes close together achieves short collection times and allows fast counting rates
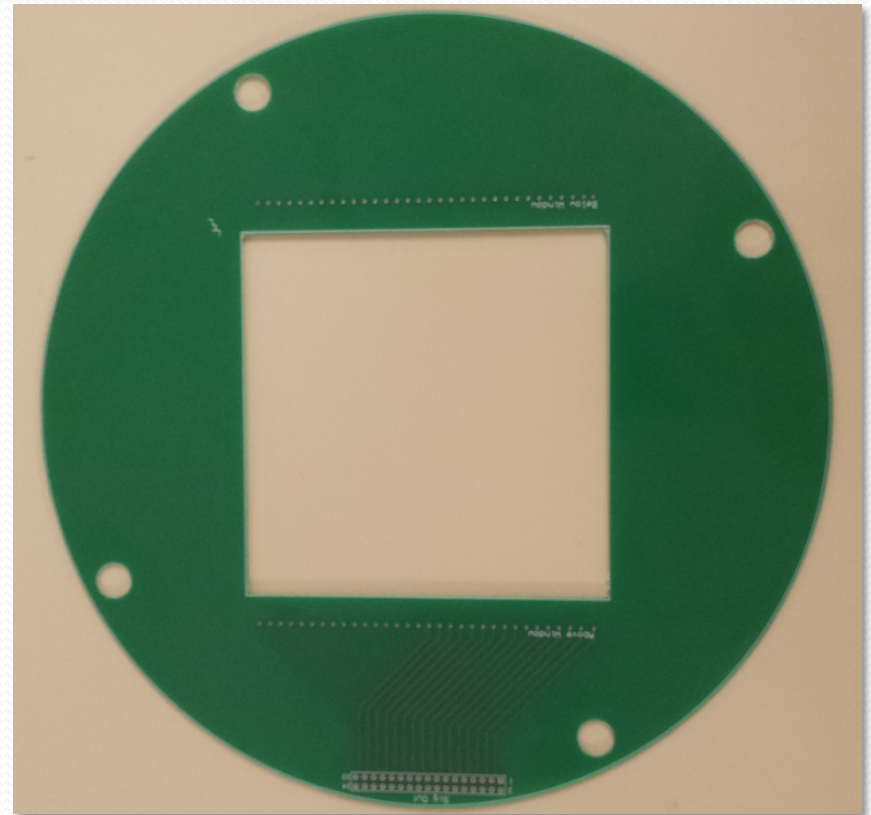
Electronics

- High density feed through routes 64 signals to a 72 channel preamplifier box
- From an electronics standpoint this is somewhat difficult
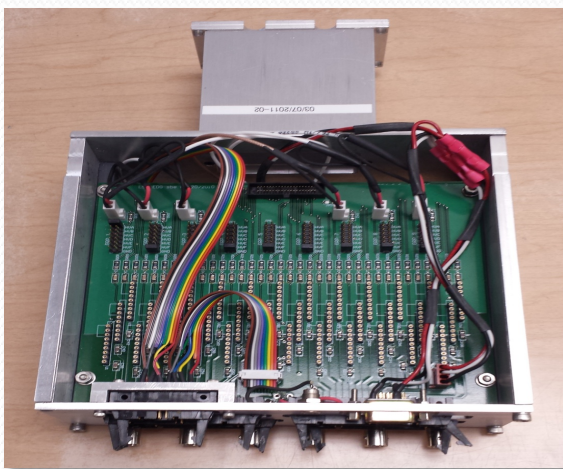
Data Acquisition

- This ionization chamber, in conjunction with ASIC electronics, was tested using oxygen 17 and fluorine 17 beams at FSU

- An iris was installed up beam from the ion chamber so we can focus the beam into the chamber
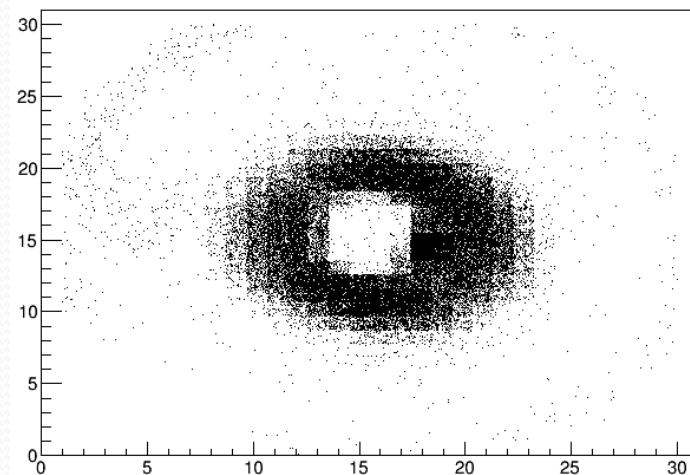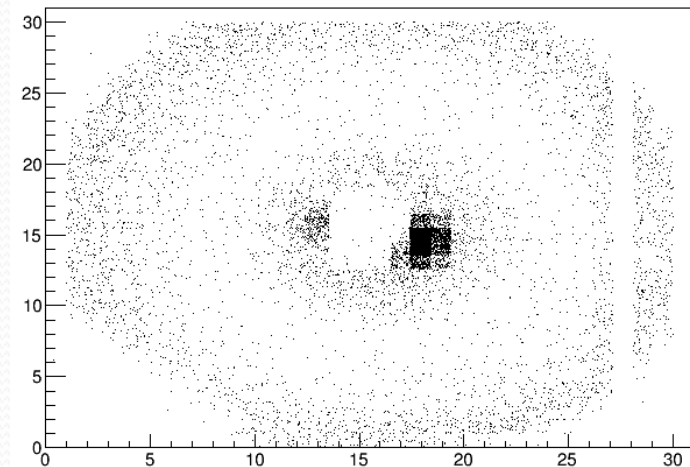
Acknowledgements

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