



PIXE

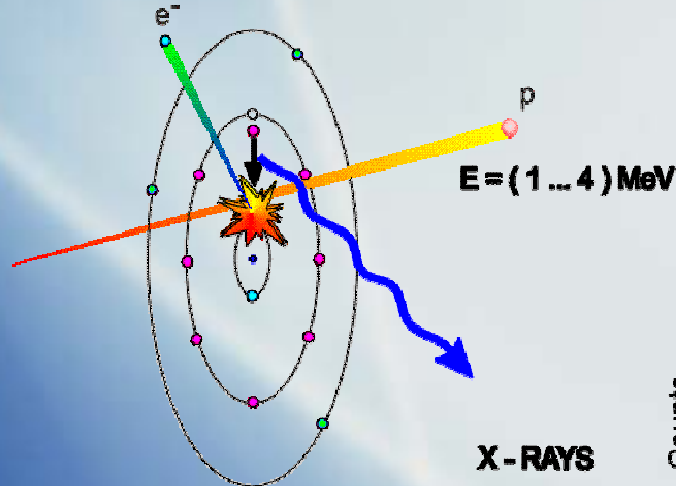
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Why PIXE?

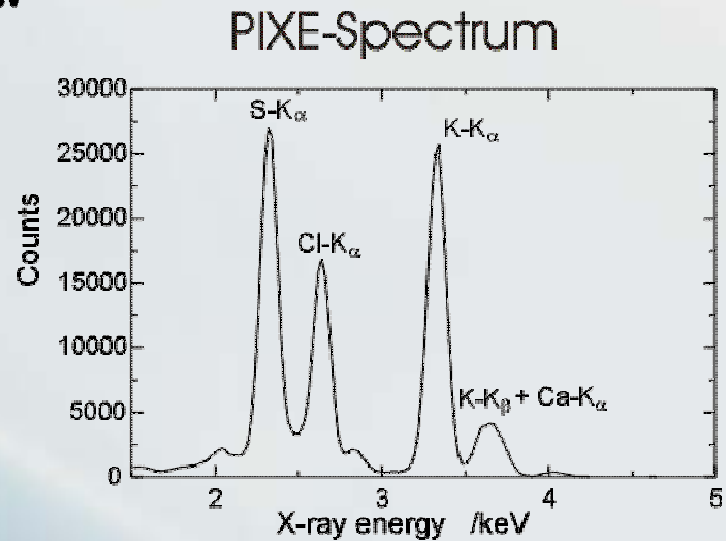
- Won't damage the sample
- Helps determine the elemental composition of the sample
- Detects very low traces of various elements
- Used in authenticating art, archeological artifacts, and geological specimens

What Is PIXE?

- PIXE- Proton Induced X-ray Emission



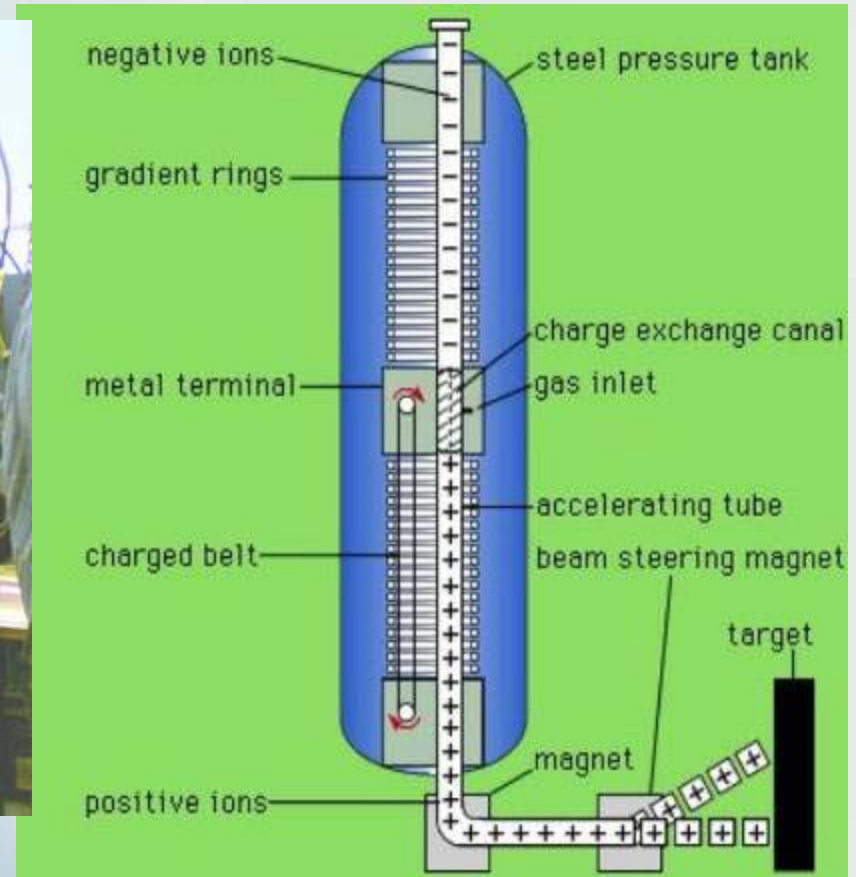
From the Division of Nuclear Solid State Physics at
University of Leipzig



Lab Setup



FN Accelerator



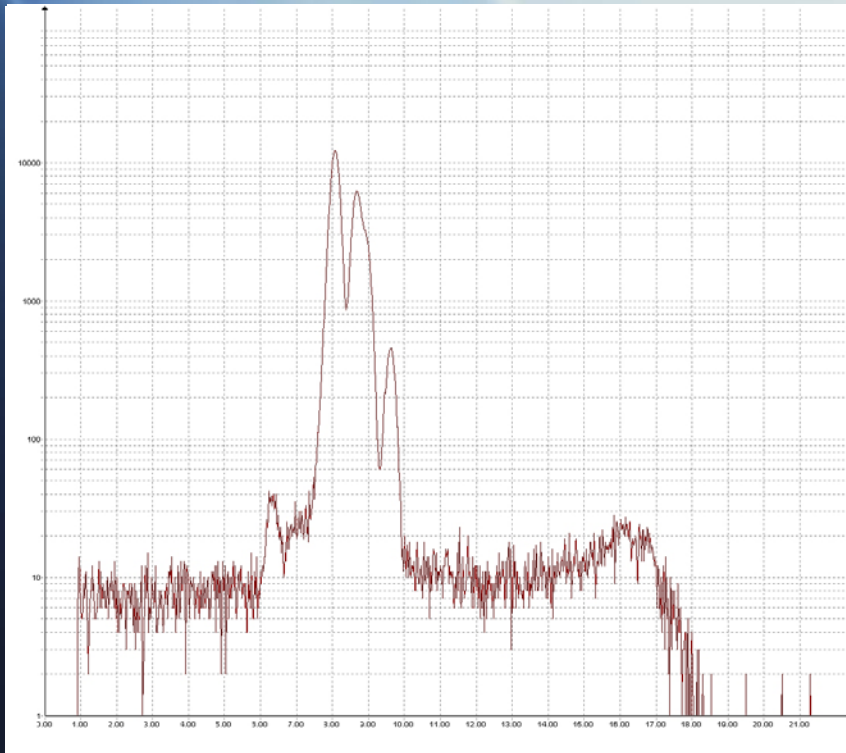
Target Room



Control Room

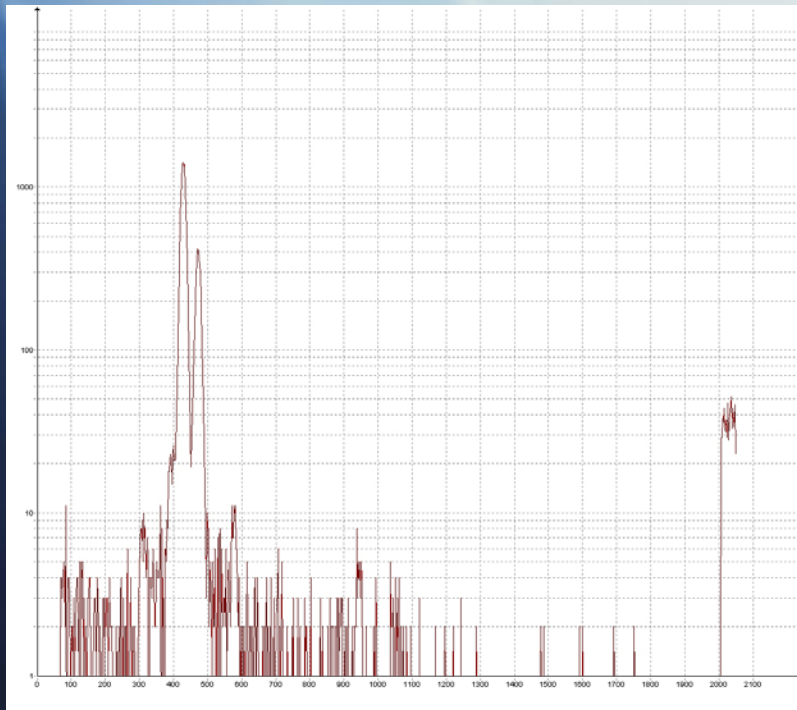


1983 Penny



- Y-axis units are “Counts”
- “Counts” keep track of the number of times the detector absorbed a particular element’s X-ray
- X-axis units are “KeV”, which is a unit of energy
- Each element is identified by the energy of the X-ray it emits
- X-rays are divided into K-alpha rays and K-beta rays, which create two peaks on the graph for each element
- Here, the beta of Copper overlaps with the alpha of Zinc, making the peaks blend together, resulting in the dominant presence of Copper and Zinc

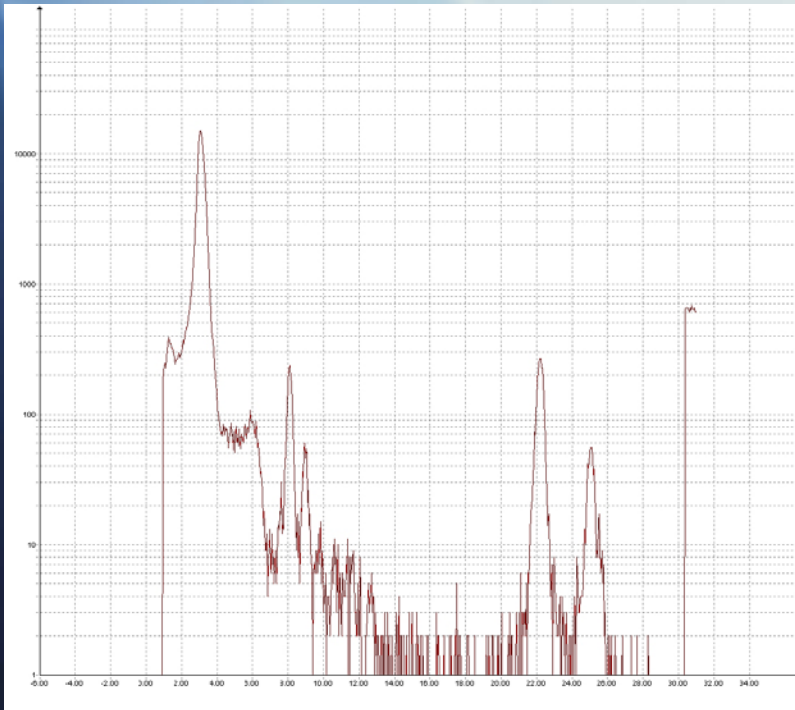
Basilica



- The Basilica has, in descending order:
- Iron
- Strontium
- Copper
- Titanium

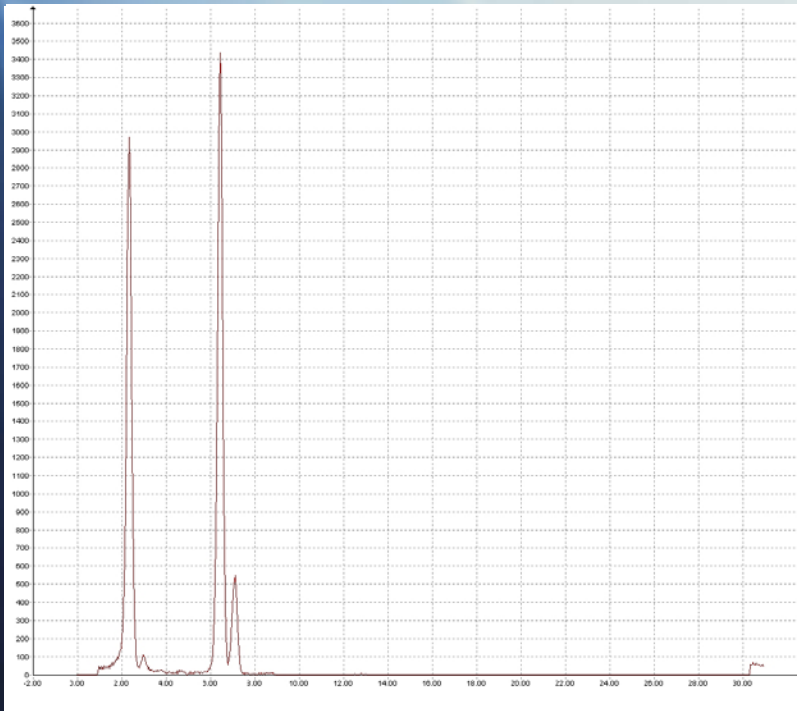
Roman Coin

- The alpha and beta peaks overlap on this graph, however, Silver, Copper, and Manganese are the main elements present



Fool's Gold

- On the left you can clearly see the alpha and beta peaks of Sulfur and on the right is Iron.



Conclusion

- We found the process relatively easy to learn, understand, and use
- PIXE is useful for determining the elemental composition of various artifacts and historical documents
- We found that items we thought contained different elements actually contained a lot of the same elements.
- The most common elements we found were Iron and Strontium
- It quickly became apparent that PIXE is easy and beneficial to the scientific community