

PIXE cyclotron

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Abstract

PIXE analysis plays an important role in various fields of research such as biology, biomedical sciences, environmental sciences, archeology, and material sciences. We have performed PIXE analysis at the Sasaki Taro memorial PIXE center in Hakodate, Japan where a 3-MeV AVF cyclotron and two beam lines for horizontal and vertical irradiations have been installed. The center has not been able to offer PIXE analysis in recent years because of cyclotron troubles and the cyclotron was repaired recently.

In order to optimize acceleration variations, we measured beam profiles with internal probes and investigated in beam intensity for various parameters concerning RF system as well as internal ion source and deflector. As a result, we succeeded to transport proton beams of about 3.8 on the target, that is sufficient for the conventional PIXE analysis. We were recognized that the betatron resonance plays an important roll for the beam extraction.

A significant number of neutrons from the cyclotron due to the $^{65}\text{Cu}(p,n)^{65}\text{Zn}$ reaction were observed during the operation, indicating the main source of the beam loss in the cyclotron.

In this symposium we will report details of the present status of PIXE facilities and the above cyclotron at the Sasaki Taro memorial PIXE center.