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PIXE and XRF Analysis of Roman Denarii[1] CECILIA FASANO, MARK RADDELL, KHACHATUR MANUKYAN, EDWARD STECH, MICHAEL WIESCHER, Univ of Notre Dame — A set of Roman Denarii from the republican to the imperial period (140BC-240AD) has been studied using X-ray fluorescent (XRF) scanning and proton induced x-ray emission (PIXE) techniques. XRF and PIXE are commonly used in the study of cultural heritage objects because they are nondestructive. The combination of these two methods is also unique because of the ability to penetrate the sample with a broader spectrum of depths and energies than either could achieve on its own. The coins are from a large span of Roman history and their analysis serves to follow the economic and political change of the era using the relative silver and copper contents in each sample. In addition to analyzing the samples, the study sought to compare these two common analysis techniques and to explore the use of a standard to examine any shortcomings in either of the methods. Data sets were compared and then adjusted to a calibration curve which was created from the analysis of a number of standard solutions. The concentrations of the standard solutions were confirmed using inductively coupled plasma spectroscopy. Through this we were able to assemble results which will progress the basis of understanding of PIXE and XRF techniques as well as increase the wealth of knowledge of Ancient Roman currency.

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