

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

X-Ray Fluorescence Imaging of Ancient Artifacts ROBERT THORNE, ETHAN GEIL, Cornell University, KATHRYN HUDSON, CHARLES CROWTHER, Oxford University — Many archaeological artifacts feature inscribed and/or painted text or figures which, through erosion and aging, have become difficult or impossible to read with conventional methods. Often, however, the pigments in paints contain metallic elements, and traces may remain even after visible markings are gone. A promising non-destructive technique for revealing these remnants is X-ray fluorescence (XRF) imaging, in which a tightly focused beam of monochromatic synchrotron radiation is raster scanned across a sample. At each pixel, an energy-dispersive detector records a fluorescence spectrum, which is then analyzed to determine element concentrations. In this way, a map of various elements is made across a region of interest. We have successfully XRF imaged ancient Greek, Roman, and Mayan artifacts, and in many cases, the element maps have revealed significant new information, including previously invisible painted lines and traces of iron from tools used to carve stone tablets. X-ray imaging can be used to determine an object's provenance, including the region where it was produced and whether it is authentic or a copy.

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Date submitted: 23 Nov 2010

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