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# Penetrating Corrosion on Ancient Coins using Neutron-CT at ANTARES

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Large numbers of coins from the Greco-Roman period have been excavated, and continue to be excavated. They can, particularly in sealed contexts, provide crucial information about the dating of stratigraphic layers in-as-much as most coins can be dated by their legends and iconography to relatively narrow brackets of time. Unfortunately these coins frequently suffer from the build-up of corrosion products on their surface during hundreds of years of burial. Removal of this corrosion by chemical or mechanical means often produces disappointing results. As a complement to X-ray CT, experiments were conducted at the ANTARES in 2010 to explore the possibility of using high-spatial resolution Neutron Computed Tomography to "see through"these corrosion products non-destructively. On the small sample of coins imaged during the pilot project several positive observations are possible. First, neutron radiographs were not a reliable predictor of the contrast produced by Neutron CT. In cases where almost none of the legend could be read on the Neutron radiograph, significant improvements were seen on the examination of CT slices. Second, Neutron CT equalled or exceeded X-ray CT in allowing the identification of otherwise wholly occluded features. Finally, the markedly different mass attenuation coefficients of neutrons meant that conservators could examine the layers of corrosion product on the coins in cross-section, whereas with X-ray CT the energies required to achieve 40% penetration of the copper bulk of the coin meant that the less dense corrosion was invisible.

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