5th Italy-Australia Workshop:

**"Synchrotron Radiation X-Ray Imaging for Life Sciences & Cultural Heritage"**

# Multi-wavelength elemental contrast imaging

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The spatial distribution of individual elements in compound samples is the subject of extensive interest in many fields. The most common X-ray full-field imaging technique with elemental mapping capability is the so called Absorption-Edge Contrast Imaging [1, 2]. Here the contrast of an element of interest in a compound sample is obtained by normalizing two intensity measurements obtained at two energies above and below an absorption edge of a given element. This technique can produce useful quantitative data for absorbing samples imaged in the near field region. However, several conditions exist under which quantitative data cannot be obtained. In particular, when the energy interval between the two energies is large or when the percentage composition of the element in a compound sample is low.

We introduce a technique to overcome the limitations of the conventional technique. Our Technique is called Multi-wavelength Elemental Contrast Absorption Imaging (MWECAI) [3, 4].This method involves three intensity measurements at three different energies across an absorption edge of the element of interest. The additional measurement can be used to enhance the distribution of the element of interest while suppressing the distributions of others. We will present experimental results demonstrating an improvement in sensitivity compared to the conventional technique. The technique allows for an accurate determination of the elemental distribution in a compound sample even at a low level of percentage composition. It is also robust to the choice of energy intervals [3].

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