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## Single-shot multi-keV X-ray absorption spectroscopy using an ultrashort laser wakefield accelerator source

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X-ray absorption spectroscopy can provide a wealth of information about a sample, including a simultaneous measurement of the temperature and structure of both the electrons and ions, via techniques such as XANES (X-ray Absorption Near Edge Structure). If these measurements can be made using a single ultrashort probe pulse at multi-keV energies, they provide a powerful tool for investigating ultrafast processes and laboratory-based high energy-density (HED) samples. States which are notoriously difficult to probe due to their extreme conditions and transient nature.

The X-rays generated by a laser wakefield driven electron beam are uniquely suited for such measurements. The pulse duration is on the order of 10's of femtoseconds, the photon flux and energy available ( $E_{crit} \approx 25$  keV) can penetrate relatively large samples, and the smooth broadband spectrum is ideal for absorption measurements.

We present single-shot XANES measurements of the K-edge of a cold titanium sample from a recent experiment at the Gemini laser facility. Quantitative measurements of the slope and pre-edge absorption features are made. With appropriate experiment setup improvements the post-edge features should be resolvable, providing access to the ion component of the sample.

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