

## **Scanning X-ray Microscope – a need for precision**

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Recently, soft X-ray microscopes can resolve structure of 10 nm. To achieve this resolution in scanning microscopes is especially challenging. At the Advanced Light Source an evolution of the original STXM design is keeping up with the steady progress in the zone plates. The base of the performance is a differential interferometer working in a feedback loop of the control of scanning piezo stage. Typical relative vibrations have amplitude of less than 2 nm. Experience obtained during last few years designing and running various STXMs at the ALS is being applied to a new soft x-ray ambient pressure scanning photoelectron microscope. The challenge building the SPEM is even greater than in case of a STXM. The typical differentially pumped electron energy analyzer has many turbo pumps which are inducing relatively strong vibrations. The sample mounting is also usually more complex and prone to same vibrations. In addition, the electron energy analyzer and the sample have very well defined relative positions and they are not readily movable, thus the zone plate, the OSA and in most cases the x-ray beam has to be adjusted. In the case of the ALS SPEM, it has been chosen to do a fine scan with the zone plate and a coarse scan with the sample. Seamless connection of those two motions has proven especially difficult. Detail design of the ALS SPEM will be presented with special accent on the chosen solutions to reduce vibrations and increase motion precision.