MS39-04 | Liquid-Metal-Jet X-Ray Source for Time-Resolved SAXS Studies in the Home Laboratory

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High-end x-ray scattering techniques rely heavily on the x-ray source brightness for resolution and exposure time. Traditional x-ray tubes are typically limited in brightness by when the e-beam power density melts the anode. The liquid-metal-jet technology has overcome this limitation by using an anode that is already in the molten state.

Since the liquid-metal-jet technology was introduced over 10 years ago, it has moved from prototypes into fully operational and stable X-ray tubes running in labs all over the world. Multiple users and system manufacturers have since installed the metal-jet anode x-ray source into their high-end SAXS set-ups demonstrating unprecedented home-lab results.

A specifically challenging SAXS application is to monitor dynamic systems, requiring time-resolved data. In this communication we will focus on few recent time-resolved SAXS results from both materials science and biological applications.

One example is from researchers at the Slovak Academy of Science and STU Centre for Nano-diagnostics performed in-situ tests on a strain gauge, based on a monolayer of colloidal gold nanoparticles deposited on a flexible Mylar foil where the MetalJet allowed a very fast data collection, with 10 seconds temporal resolution.

Another SAXS application that is attracting significant interest at synchrotrons is BIO-SAXS using SEC-SAXS technique. Researchers at University of Copenhagen together with scientists from Xenocs SAS has successfully demonstrated home lab SEC-SAXS of protein solutions with concentrations as low as 1 mg/ml.