Contribution ID: **45** Type: **Poster**

Time resolved crystallography at ELI Beamlines facility

Thursday, 7 September 2017 12:40 (1h 50m)

The novel X-ray sources that are based on plasma generated from femtosecond lasers will allow for time resolved X-ray diffraction structural studies on a femtosecond time scale. The principle of the laser driven plasma sources shares similarity with the well known laboratory Metal jet sources. Instead of electron beam, the liquid metal is exposed to an intense laser beam. The ELI beamlines facility is planned to start user operation by the end of 2018 in Dolni Brezany, Czech Republic. It will give a unique advantage for time resolved crystallography and wide angle scattering for a crystalline samples, including proteins. The generated pulses will span approx. 100 fs with a repetition rate of 1 kHz. The scattered and diffracted by the crystal X-rays will be counted using a DECTRIS Eiger 1M area detector which operates at the same frame rate as the source, i.e. 1 kHz. Such setup can be combined with several pump probe lasers to study the fast kinetics for example in proteins with photo properties.

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Session Classification: Poster session