

Development of Direct Laser Melting (DLM) deposition system for in-situ use on neutron beam instruments

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Direct Laser Melting (DLM) deposition is an additive manufacturing technique in which a high power laser is used to create a melt pool on a workpiece while a jet of metal powder is applied, resulting in localised material deposition. This technique is used in industry for additive repairs, cladding with dissimilar metals, or, in conjunction with a CNC milling machine, as a full-fledged 3D additive fabrication platform. As the prominence of this technology rises, so too does interest in characterising deposition dynamics over a vast parameter space. Neutron beam instruments offer unique capabilities for such characterisation.

As part of the NSW Research Attraction and Acceleration Program, ACNS is developing world first sample environment capabilities enabling in-situ laser metal deposition, for use on KOWARI and DINGO beamline. The system will utilise a self-contained motion stage and laser cladding head which will construct a thin wall structure on a user specified substrate, utilising up to two metal powders at a time. Neutron studies of the melt pool or heat affected zone can then be performed during and after printing.

This paper will present the technical specifications and capabilities of the system, which will be available to the user community in late 2021.

Speakers Gender

Male

Level of Expertise

Early Career <5 Years

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