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3D printing of photocurable scintillating and low-background materials

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Plastic scintillators are one of the most widely used active materials in nuclear and particle physics experiments. Their reliability, simplicity to operate, and low-cost make them the material of choice for many applications. The introduction of modern additive manufacturing techniques opens the possibility of expanding their use to increased complexity or production scales through 3D printing. While multiple techniques for 3D printing of plastics exist, light-based techniques such as stereolithography (SLA) and digital light processing (DLP) are particularly attractive due to the optical clarity of SLA or DLP printed components. SLA and DLP also provide a near-contactless manufacturing technique, which is desirable for low-background experiments. In this talk, we will present on the development of photocurable scintillating resins for 3D printing of plastic scintillators using SLA and DLP methods. Resin methodology, characterization of photocured scintillators, and use their use in different 3D printing techniques will be discussed.

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