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Adhesive Technologies at Manufacture THz Mirrors

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This project describes different techniques to manufacture THz mirrors with arbitrary surfaces. The research is part of the development of THz transmission line for the compact FEL-THz accelerator.

As an initial phase flat mirrors were 3D printed with FFF (Fused Filament Fabrication) and SLA (Stereolithography Apparatus). The impact of material, layer height and layer direction to mirror's surface quality was examined. In addition, various metal coating was tested, for example vacuum evaporation and metal foil.

The 3D printed flat mirror's reflection was measured in TDS (Time Domain Spectroscopy) at 1–5 THz and compared with aluminum metal plate and glass silver coated mirror.

The results approve sufficient surface and coating quality.

Further research is manufacture off-axis parabolic mirrors, validate with a beam profiling and manufacture arbitrary surface mirrors optimized to the current accelerator by machine learning.

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