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## **Introduction to Structured Laser Beam for Alignment and Status of the R&D**

A new method of generating of a Structured Laser Beam (SLB) has been proposed recently. The SLB is a pseudo-non-diffractive optical beam. Its transverse optical intensity profile looks similar to that of a quasi Bessel beam and shows a narrow central core of high intensity surrounded by concentric circles. The SLB has the ability to propagate over very long distances, theoretically to infinity with a low divergence of the central core beam. It has been tested up to 200 m and during the experiments a divergence of typically 0.01 mrad has been measured, the diameter of the central spot at start being about 0.01 mm. The SLB properties open potential applications in different domains, comprising geodetic and large scale metrology. Even if the SLB is still at a research stage it appears as a promising candidate for the development of optical long range reference lines for alignment systems. This article is an introduction to the SLB, to its generation principle and to some of its characteristics, in particular the ones interesting for alignment. It relates the status of some aspects of the on-going research. It summarizes some SLB study results, among them the creation of SLBs at long distances, the study and simulations of beam straightness, or the creation of SLB with non-classical polarization.

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