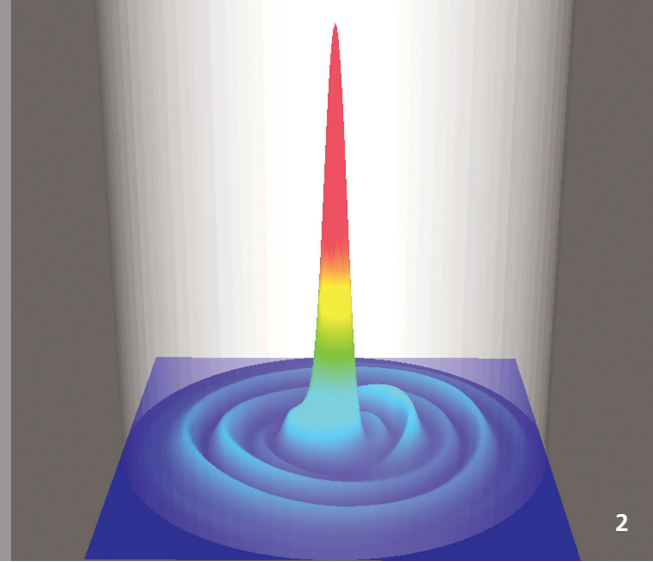


1



2

CUTTING USING WATER JET GUIDED RADIATION

Task

Precision cutting, of metals but in particular of brittle-hard materials (e.g. semiconductors, glass), places exacting demands on precision and processing quality. Special attention must be paid to the breaking strength of the workpieces and to the need to prevent recast and debris. Water jet guided laser cutting is an innovative process variant which boasts considerable potential for meeting these requirements. To fully utilize its potential, research aims to deepen the current understanding of nonlinear radiation propagation in the water jet, of workpiece cooling, and of the vaporization of water during the process.

Method

Fraunhofer ILT has at its disposal a Laser MicroJet (LMJ) system, diagnostic systems and a local high-performance computer system with which to open up new applications and new application-specific LMJ variants on the basis of model-based development.

Result

Models for simulating water jet specific subprocesses are being continually extended and honed. Based on Fraunhofer ILT know-how, a wide range of precision-machining applications is being tested locally as preparation for subsequent use in industry.

Applications

Users involved in the precision cutting of a wide range of materials, but especially of brittle-hard materials, that are looking to improve conventional "dry" laser machining and ultrashort pulse processing will benefit from the results.

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1 Illustration of the process.

2 Simulation of beam propagation in the water jet.