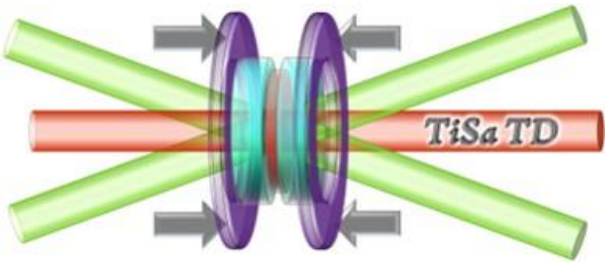

Project no. 619177
Project acronym: TiSa TD
Project title: Ultrafast High-Average Power Ti:Sapphire Thin-Disk Oscillator and Amplifiers

Collaborative Project (STREP)

FP7-ICT-2013-11
Information and Communication Technologies

D7.7 – Project video

Revision 1.0

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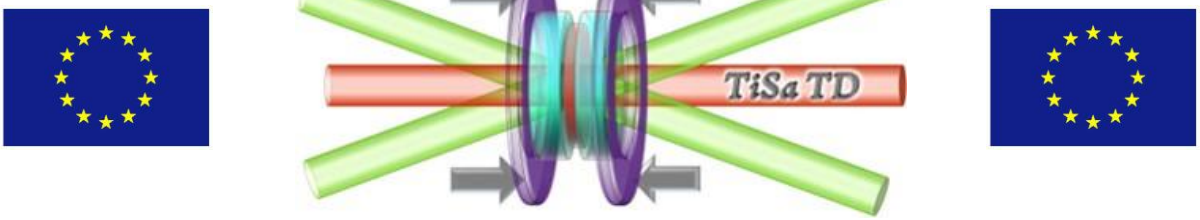
Organisation name of lead contractor for this deliverable: Universität Stuttgart (USTUTT)

Coordinator: Dr Andreas Voß (USTUTT)

Signed: Date: 31.07.2014

Project co-funded by the European Commission within the Seventh Framework Programme (2007-2013)		
Dissemination Level		
PU	Public	**X**
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	



D7.7: Project video

Nature: Other

Dissemination Level: Public (PU)

Owner

Name:	USTUTT
Lead Beneficiary:	USTUTT

Context

Author(s):	Dr Andreas Voß
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This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 619177

Contents

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1 Introduction

The TiSa TD video has been put together by the Institut fuer Strahlwerkzeuge (IFSW) Universitaet Stuttgart team (USTUTT) using media material provided by each member of the Consortium, in order to give the general public and scientific researchers an insight of the project.

The purpose of this first video is to present the project's aims, objectives and expected results as well as the partners and their individual involvement within the TiSa TD project.

The different sections of the video will unroll as follows:

1. Title and logo of the project
2. Motivation behind the project
3. Why femtosecond pulses?
4. The thin-disk laser concept
5. Symmetrical cooling & modelocked high-power oscillator
6. Multipass amplifier
7. Single-shot high-aspect ratio drilling of transparent materials
8. High-speed precision cutting of transparent materials
9. Benefits for the end-user
10. Presentation of the partners and their roles

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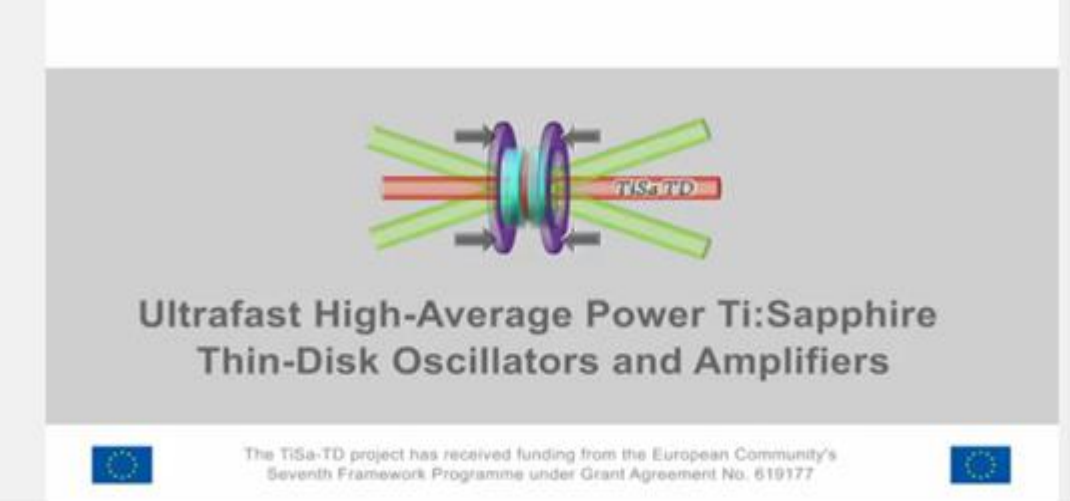
2 Presentation of the TiSa TD video

2.1 Title and logo of the project

The first shot of the video introduces the TiSa TD project's full title and official brand logo.



2.2 Motivation behind the project

A simple animation schematically shows laser cutting of the display of a smart phone. The narrator explains that laser cutting of the display glasses of mobile equipment (e.g. smart phones and tablets) is a promising application for femto-second lasers having a huge potential market.

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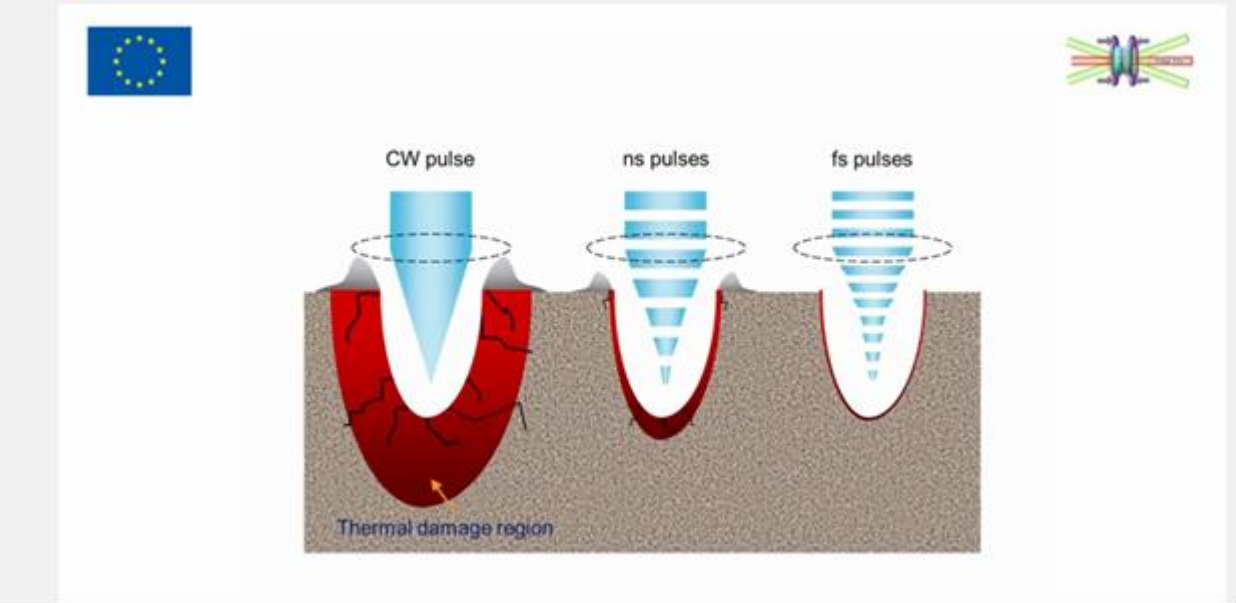
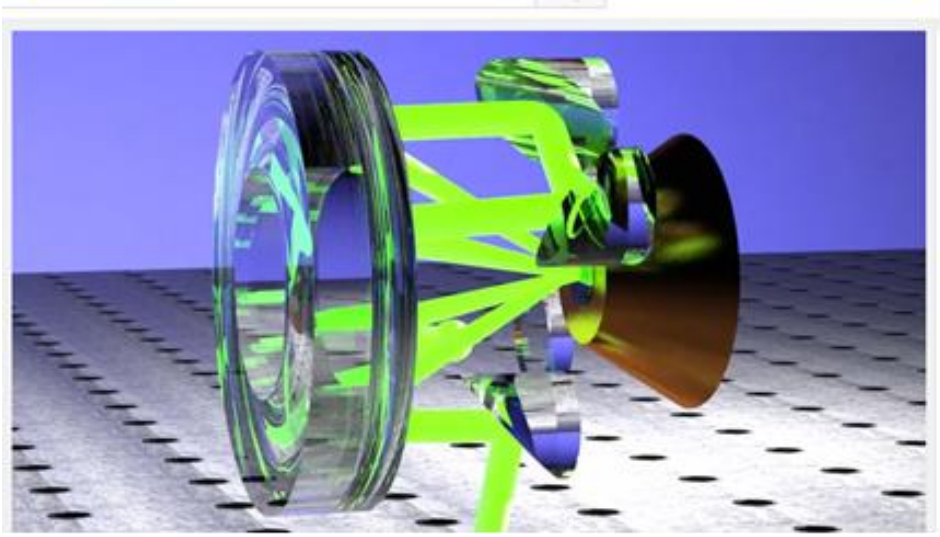
2.3 Why femtosecond pulses?

A simple animation schematically shows the thermal effects typically occurring in the workpiece depending on the pulse duration of the laser used. The narrator explains that femtosecond pulses allow achieving the best possible quality for laser material processing of transparent materials.



2.4 The thin-disk laser concept

In the computer animation, a typical single-side cooled (Yb-based) thin-disk oscillator is assembled step-by-step; in each step, the function of the actual component(s) is described by the narrator; the advantages of using the thin-disk concept (e.g. for a Ti:Sa laser) are also explained.



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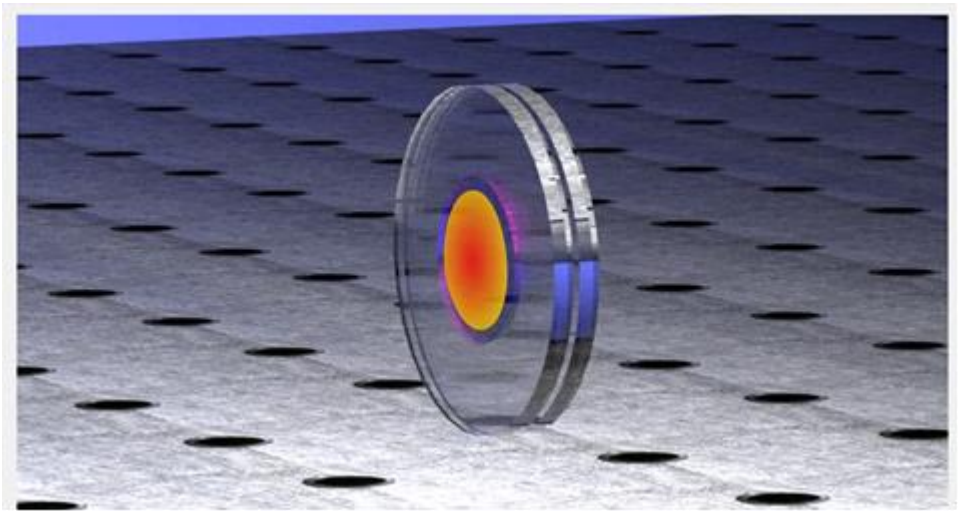
2.5 Symmetrical cooling & modelocked high-power oscillator

The modifications of the conventional thin-disk laser concept required to achieve efficient operation with Ti:Sa as laser active material are described here; the required components are shown and explained step-by-step.

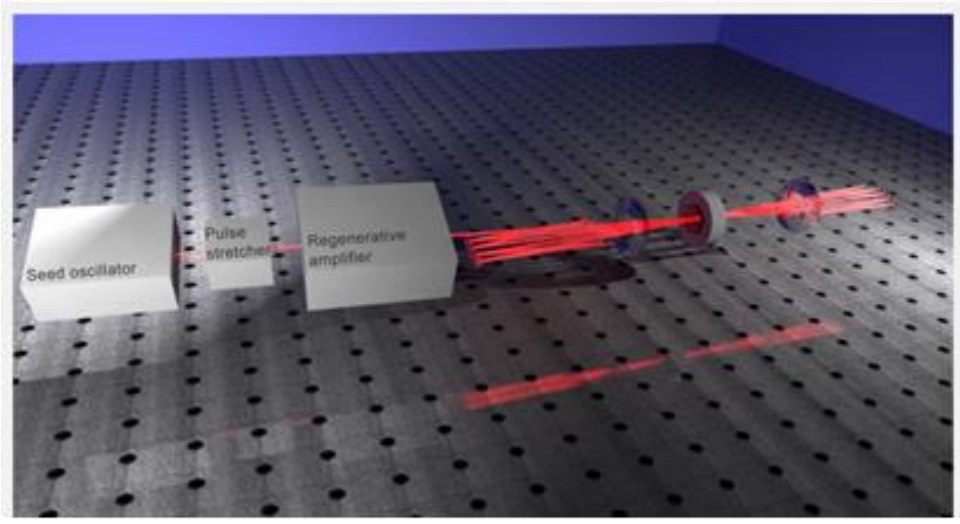
The most relevant change is the double-sided symmetrical cooling of the disk; this requires the use of transparent diamond heat spreaders.

The modelocked operation of the TiSa-TD oscillator, which will be investigated in the project, is also described.



2.6 Multipass amplifier

In this section, the setup of the high-power multipass TiSa-TD chirped pulse amplifier (CPA) system to be developed in the project is described schematically step-by-step.



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2.7 Single-shot high-aspect ratio drilling of transparent materials

As explained by the narrator, single-shot high-aspect ratio drilling of transparent materials is one of the potential applications of the high-power multipass TiSa-TD CPA system to be investigated in the project.

The video sequences show early investigations (using a laser with low repetition rates) of this application in the labs of FEMTO-ST, one of the partners, affiliated to Centre National de la Recherche Scientifique (CNRS), located in Palaiseau near Paris, France.

2.8 High-speed precision cutting of transparent materials

The narrator then goes on to explain that, among others, high-speed precision cutting of transparent materials is a promising potential application for high-repetition rate femtosecond laser systems (as the high-power TiSa-TD oscillator) to be investigated in the project.

The video sequences show several examples of material processing applications with ultrafast lasers supplied by one of the UK partners, Oxford Lasers Ltd (OXFORD).

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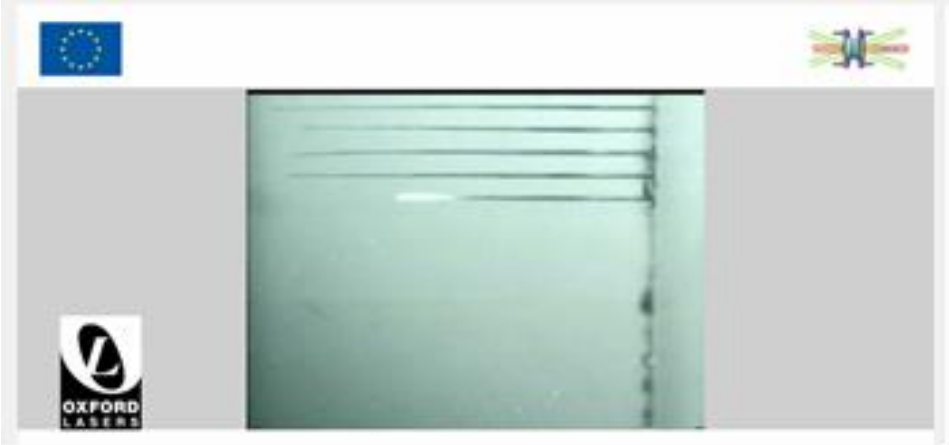
The last video sequence shows a microscopic side view of the drilling of holes with an ultrafast laser into a transparent substrate.



2.9 Benefit for the end-user

The narrator finally explains that the potential benefit of the project for the end-user is the cost-efficient production of rimless smart phone displays with higher robustness, higher scratch resistance, and less weight when using TiSa-TD lasers for materials processing.

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2.10 Presentation of the partners and their roles

The logos of the partners as well as a representative video sequence or a picture (e.g. showing a product relevant to the project) are shown in this sequence.

The narrator briefly outlines the roles of each partner within the TiSa TD project.

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3 Video accessibility

3.1 YouTube

The Video is accessible to the general public via YouTube using the following link:

https://www.youtube.com/watch?v=53Zy87DlVNo&feature=youtu.be

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