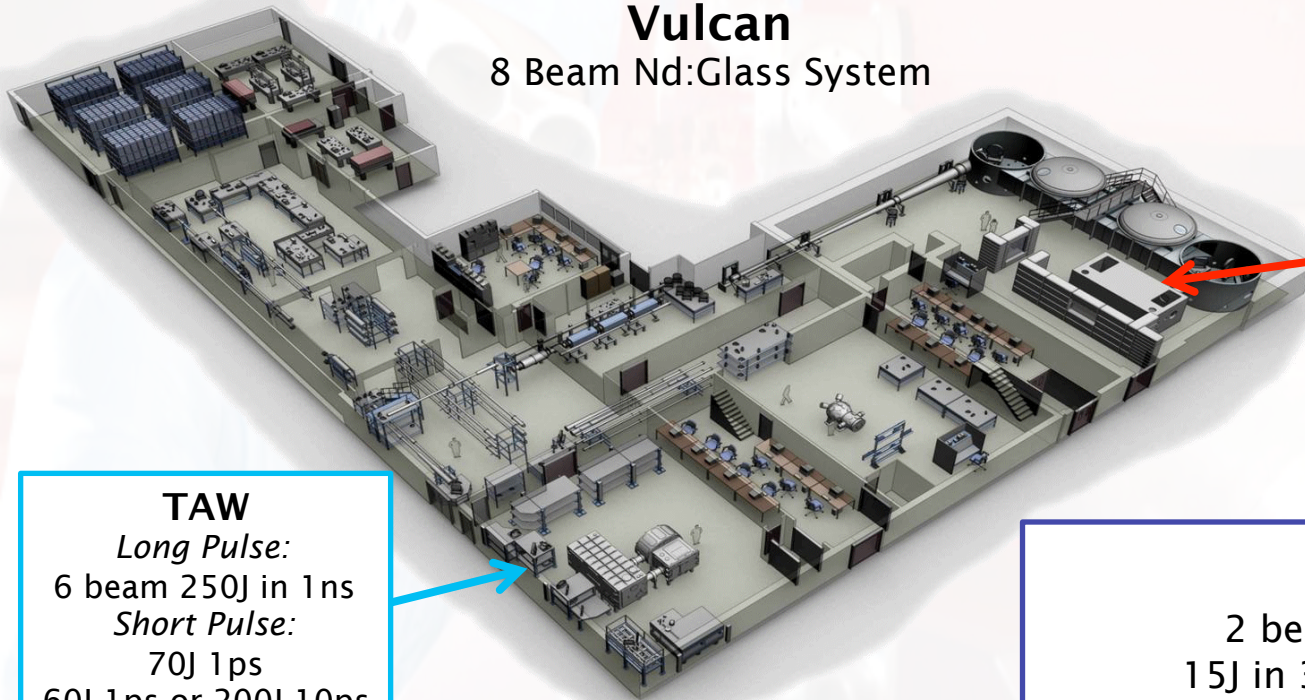# Short pulse diagnostics improvements in the Vulcan laser system

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Science & Technology
Facilities Council

Central Laser Facility - RAL

Vulcan
8 Beam Nd:Glass System

TAP
Long Pulse:
250J in 1ns
Short Pulse:
500J 500fs

TAW
Long Pulse:
6 beam 250J in 1ns
Short Pulse:
70J 1ps
60J 1ps or 200J 10ps

Gemini
2 beams TiSa System
15J in 30fs, 20s Rep. Rate

Summary

Vulcan Laser Diagnostics & Automatic Alignment

Target Area Petawatt Contrast Characterisation

Short Pulse Diagnostics

Conclusion

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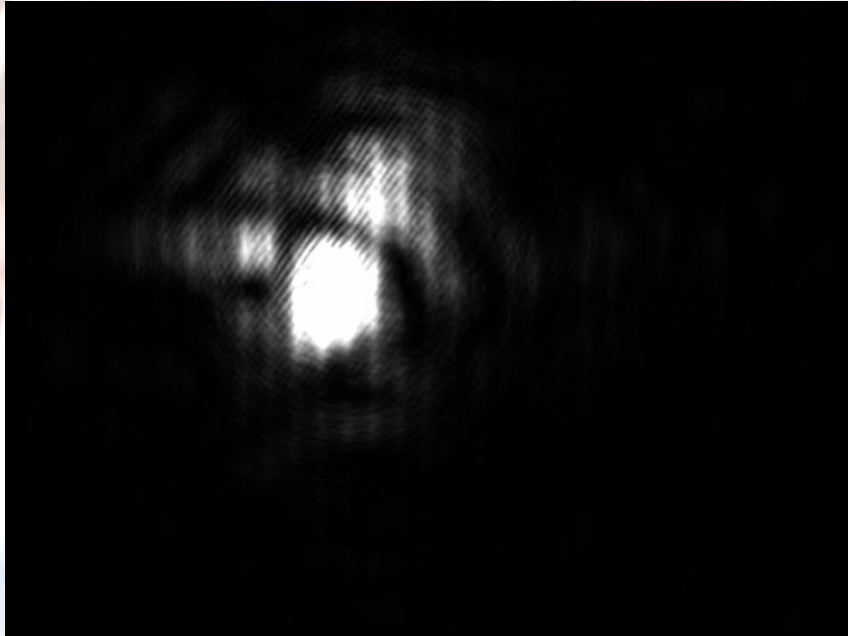# Software & Automatic Alignment

Diagnostic Server
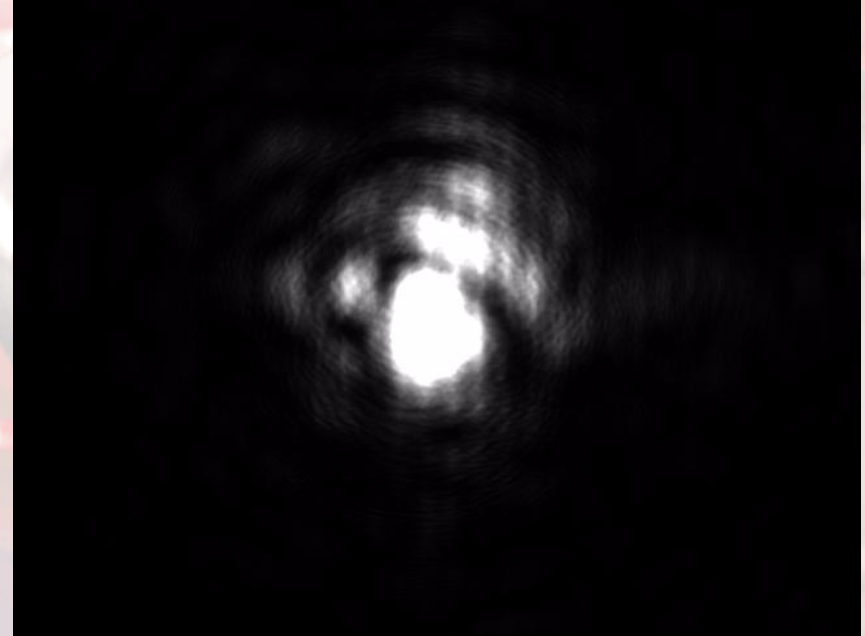
Camera Software & Automatic Alignment
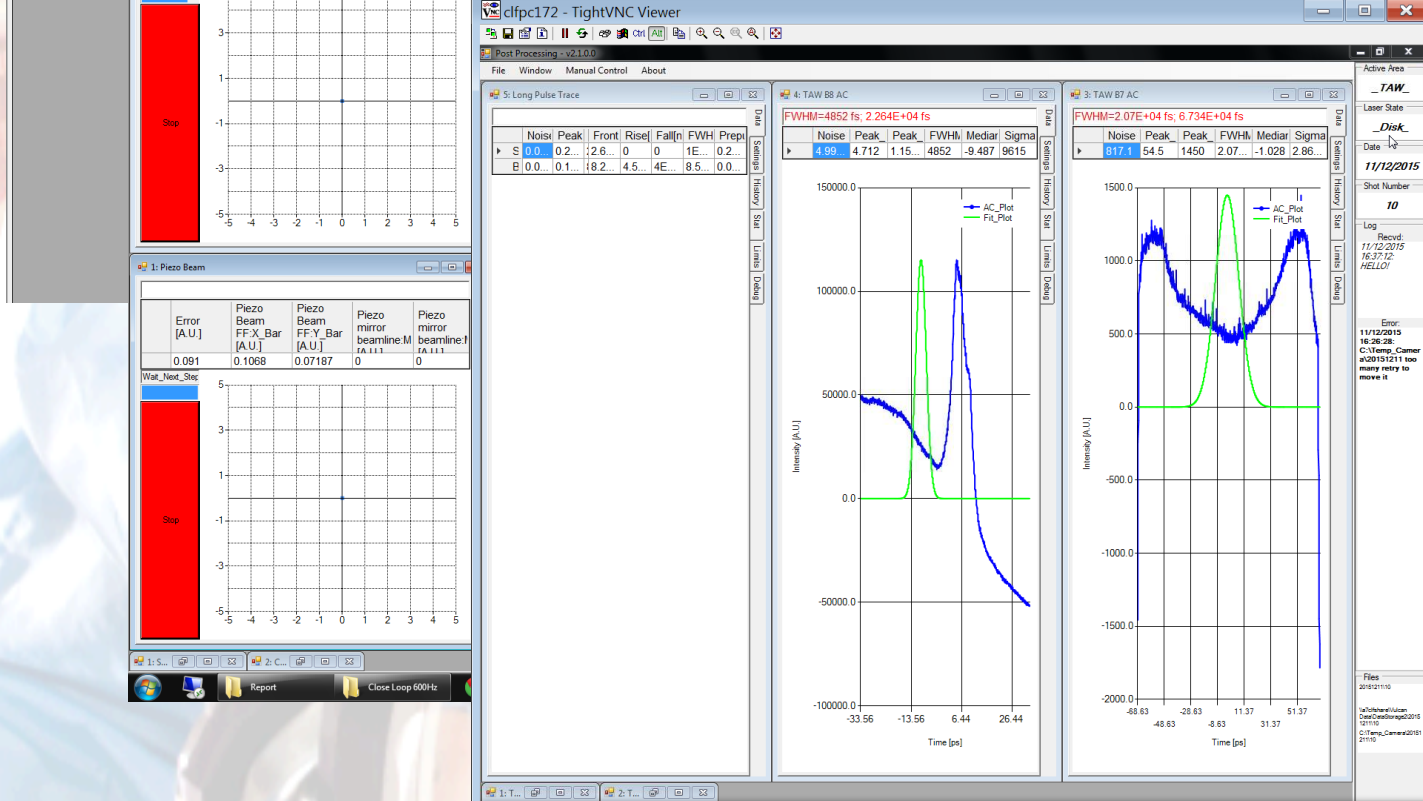
Post Processing

Fast Beam Pointing Stabilization

PID off

PID on

PS3-21 M. Galimberti, D. Shepherd, B. Parry, C. Hernandez-Gomez
Fast beam pointing stabilization for high power laser system

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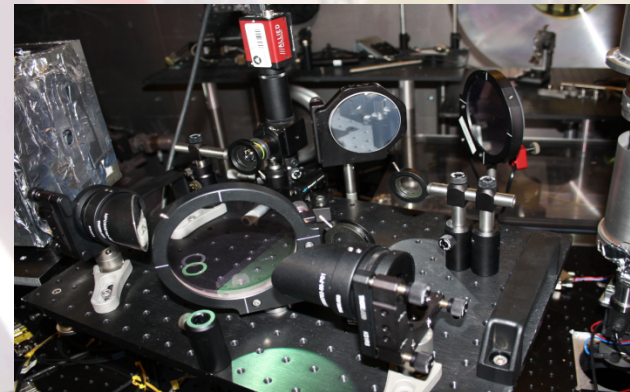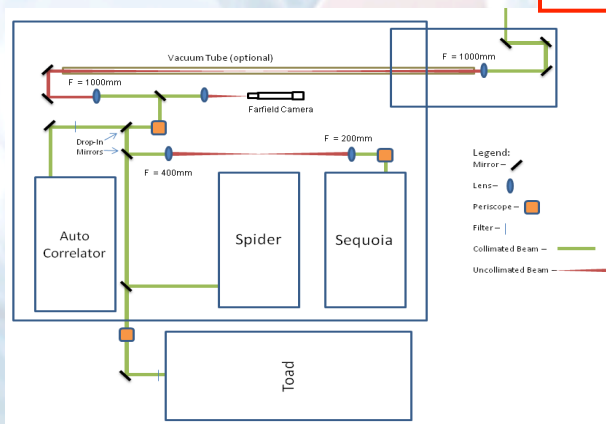
Data Database: Icat & eCat2

TAP Contrast Measurement: Layout

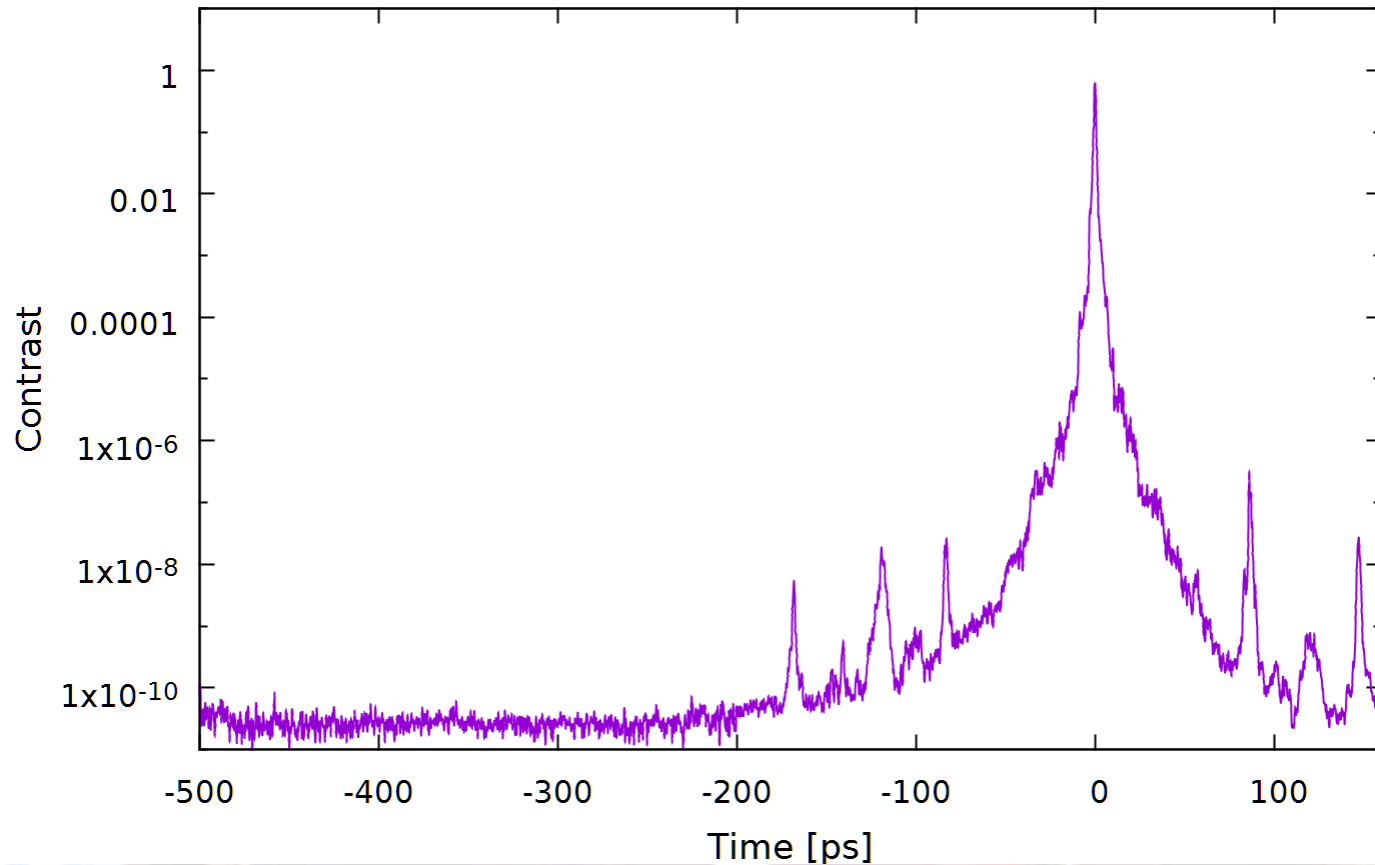Full Beam (dia 60cm) recollimated using small OAP inside target chamber
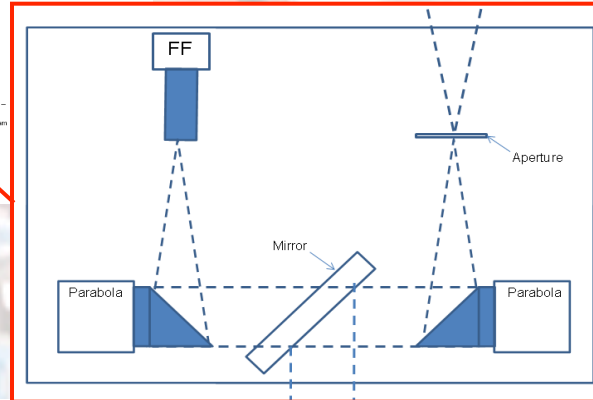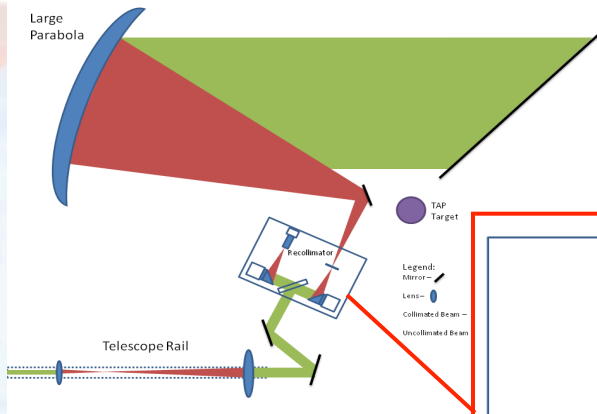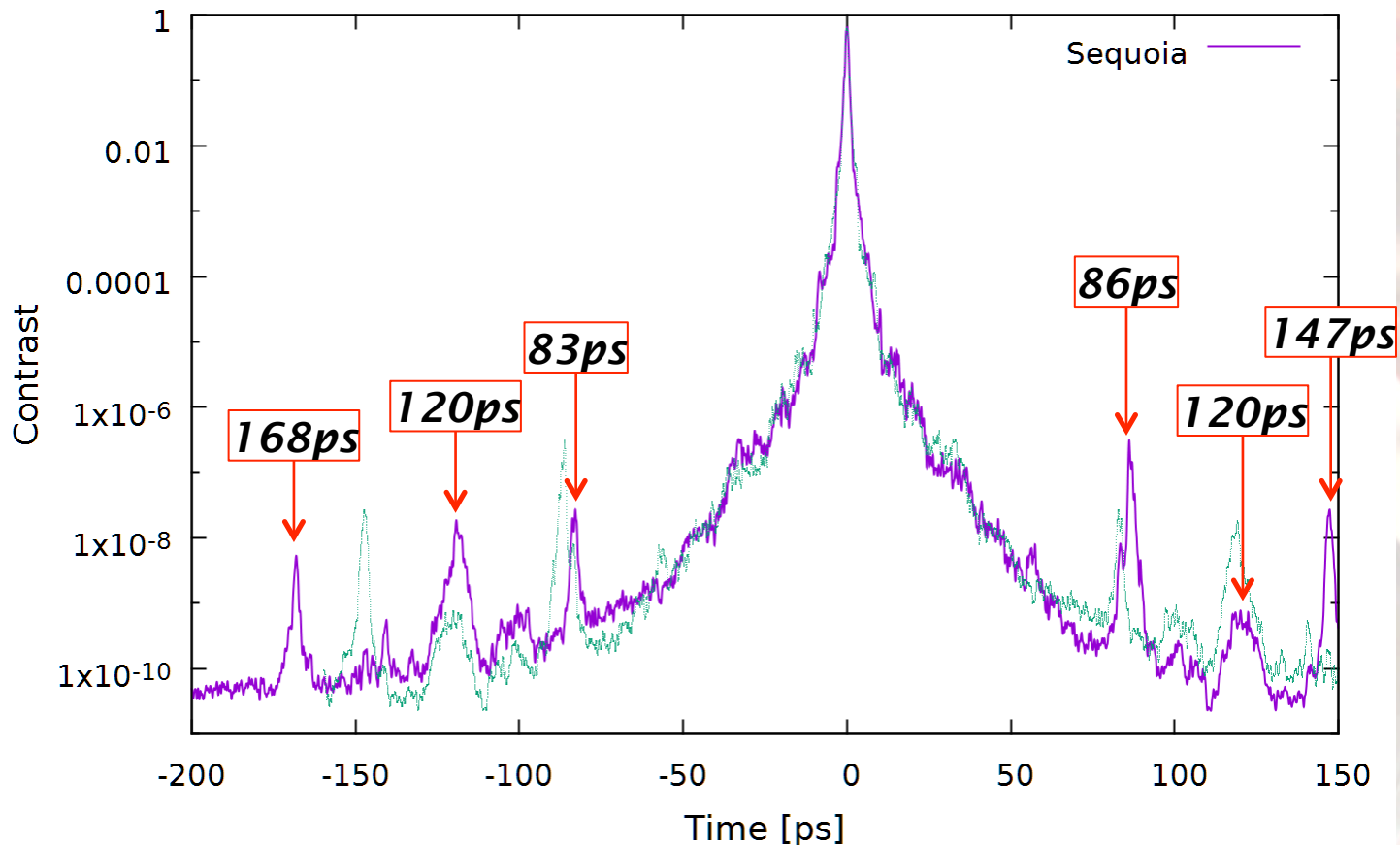
Improved relay imaging

Scan performed with only the Front-End bypassing the amplifiers
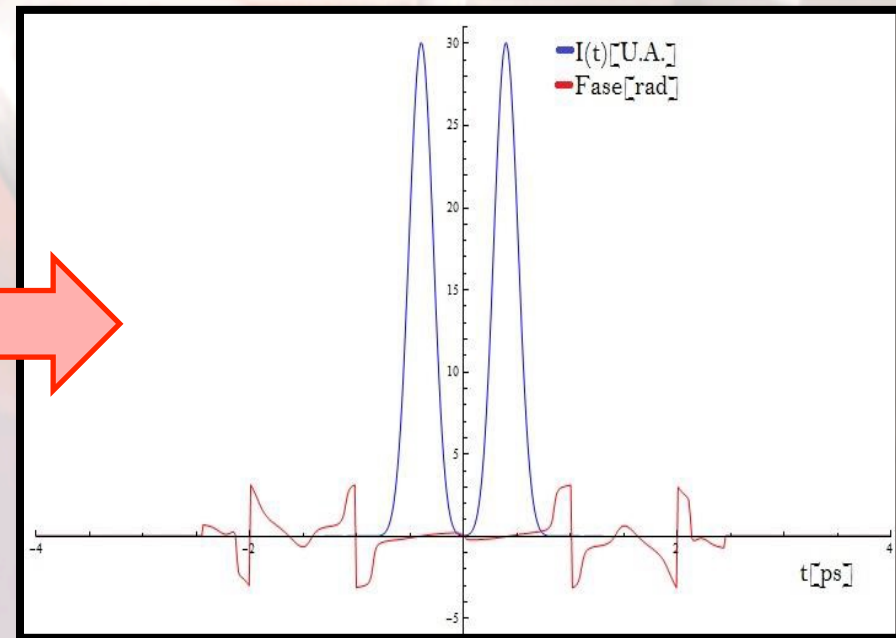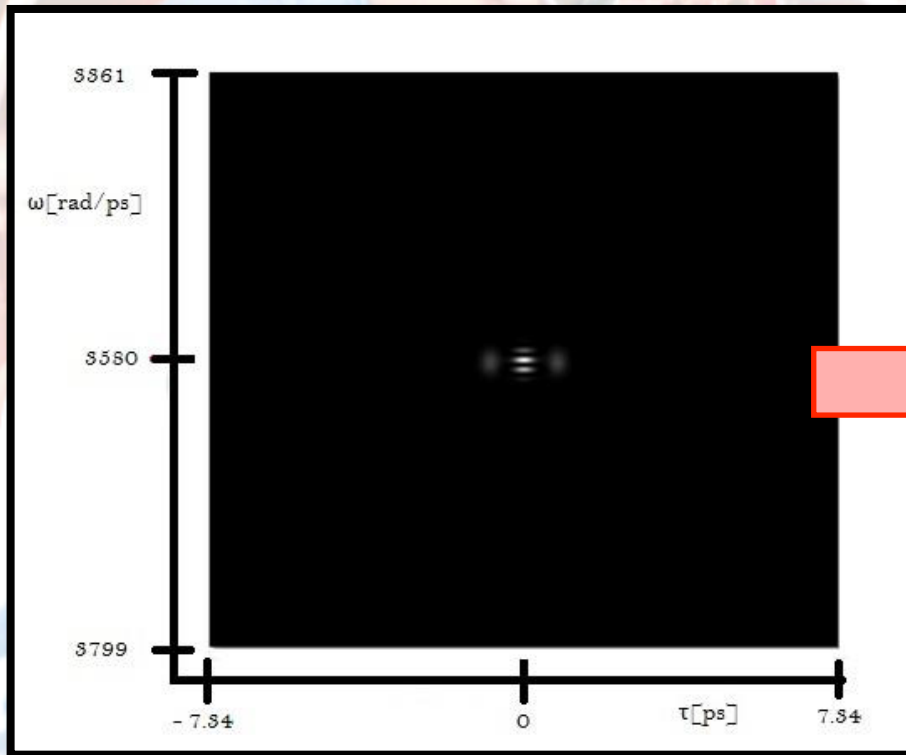
Long Scan

Pre-post pulse

New post-to-pre pulse mechanism identified

FROG/GRENOUILLE Analisys

Reconstruction Software developed by Mario Galletti in collaboration with prof. Danilo Giulietti at University of Pisa

M.Galletti, *Sviluppo di un software di riscostruzione e caratterizzazione di impulsi laser ultracorti di alta potenza, Master Thesis, 15 Dec. 2014, Pisa*

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Gemini Full Power Measurements
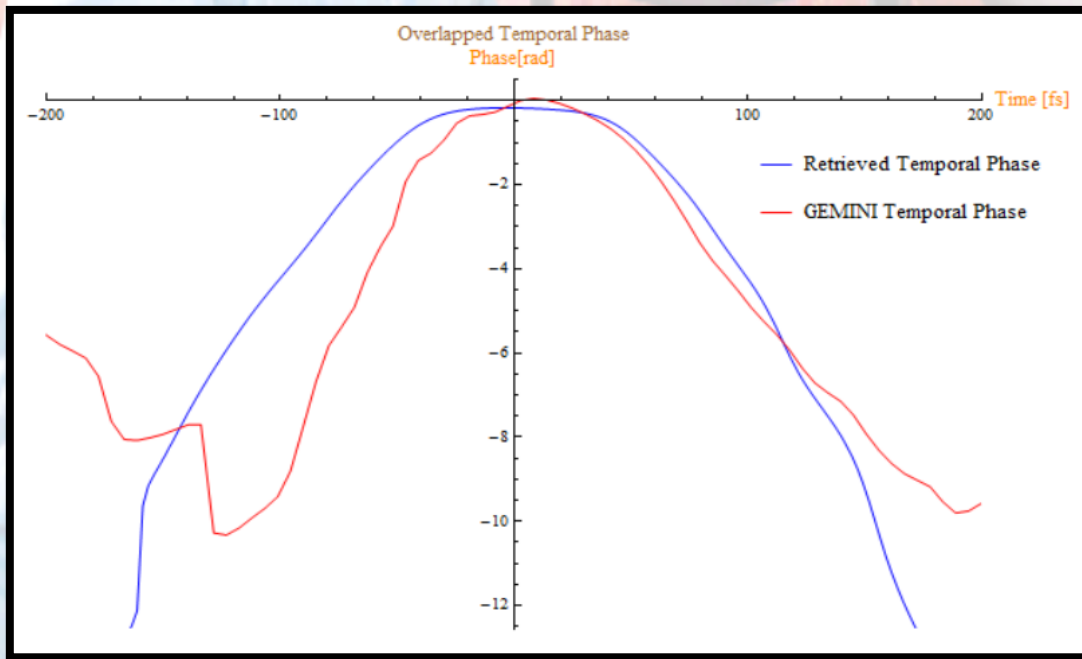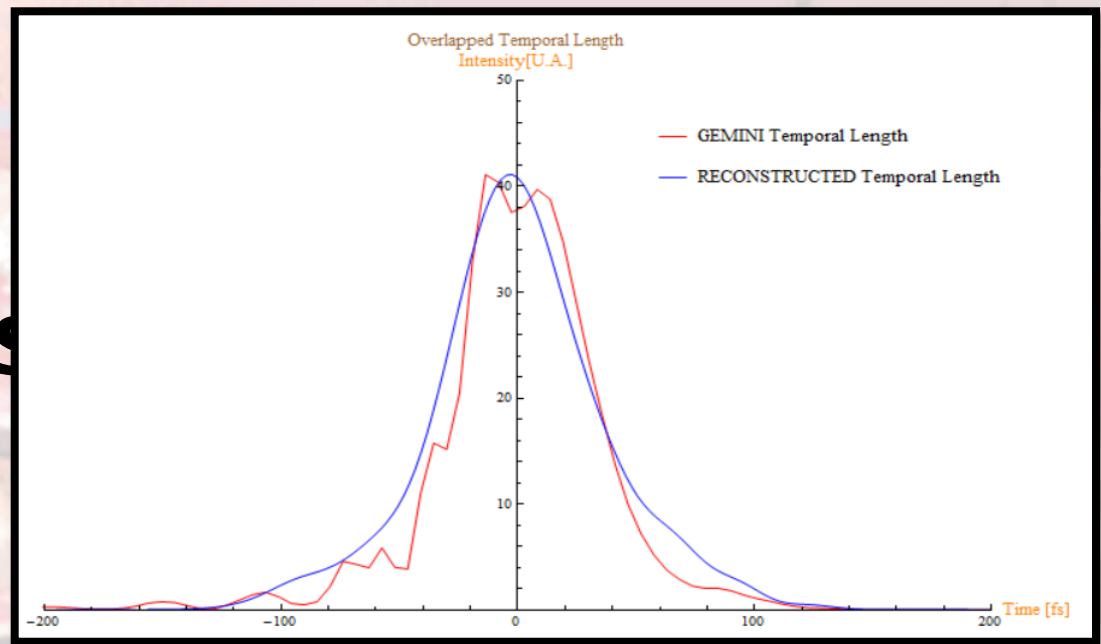
The GEMINI temporal length is 61 fs while the *reconstructed temporal length is 64.29 fs*.

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Conclusion

Improve Diagnostic Software & Add eCat viewer

Automatic Alignment is now operational

Improved Contrast Characterization in TAP

Developing new Short Pulse Diagnostics