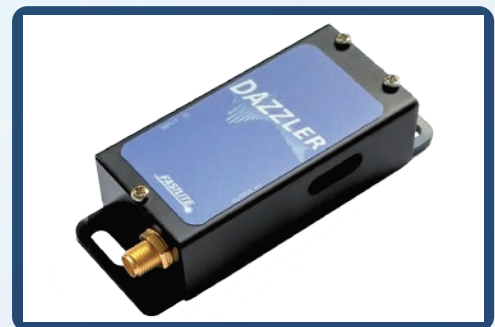# WIZZLER & DAZZLER feedback loop

Data Booklet

The **Wizzler** performs a high-dynamic, single shot spectral phase measurement. A **Dazzler**-compatible file is created, including the user-defined phase damping settings

Phase correction is applied by the **Dazzler** installed inside the amplifier front-end. As a result, pulse compression is optimized with an unprecedented level of control, without tweaking the amplifier

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This booklet contains experimental data of real ultrafast laser amplifiers over the world, and displays how the **Wizzler / Dazzler feedback loop** can be used to correct many pulse compression problems.

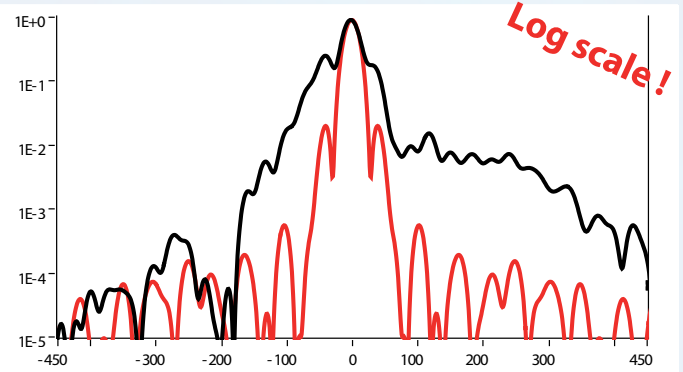3rd and 4th order, oscillatory, chaotic phase, phase jump and double pulses cases are presented...

Wizzler measurement of a mJ-class, 1kHz Ti:Sa amplifier

3rd & 4th order phase

Spectral domain
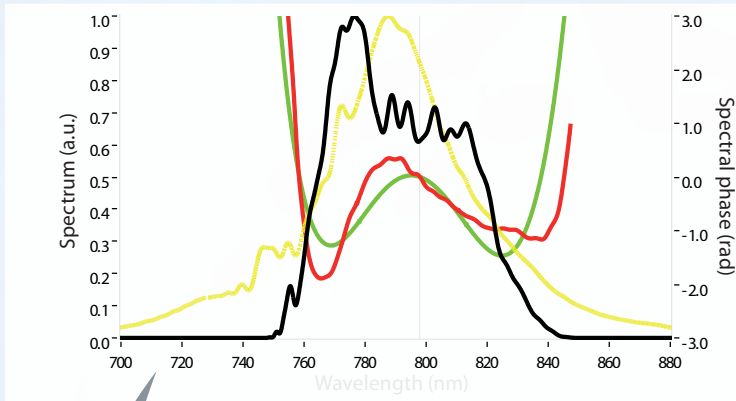
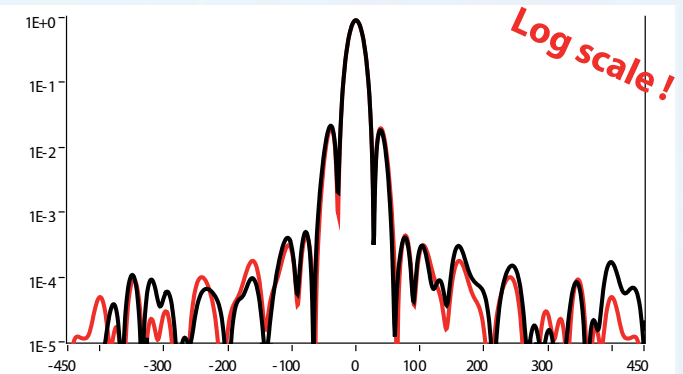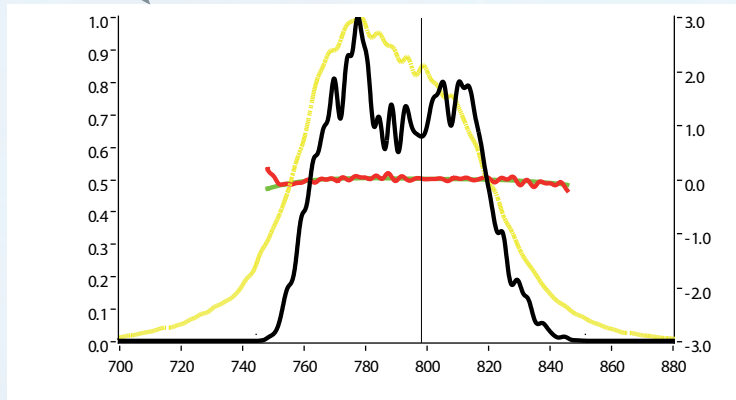**Time domain**

| Pulse duration FWHM (*Measured / FTL*) | 27,7 / 24,4 fs |
| Standard deviation σ (*Measured / FTL*) | 50,7 / 15,4 fs |

Same laser...
after a Wizzler / Dazzler feedback loop optimization

| Pulse duration FWHM (*Measured / FTL*) | 23,5 / 23,5 fs |
| Standard deviation σ (*Measured / FTL*) | 16,6 / 14,9 fs |

Legend

—— Input pulse spectrum

—— Measured spectral phase
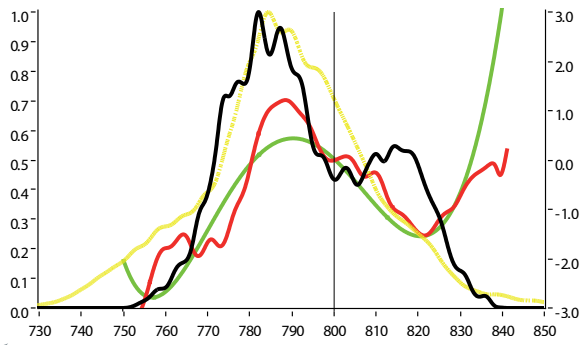
—— Reference (XPW) pulse spectrum

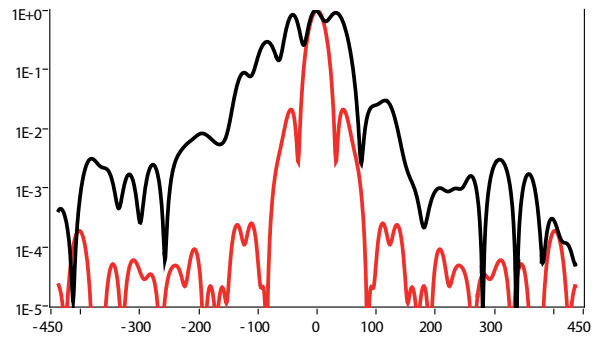—— Spectral phase - 4th order polynomial fit

—— Measured temporal profile

—— FTL temporal profile

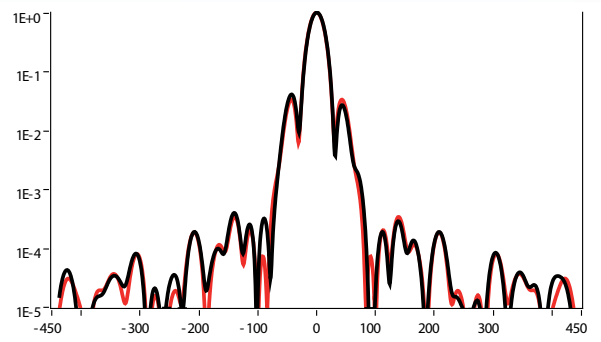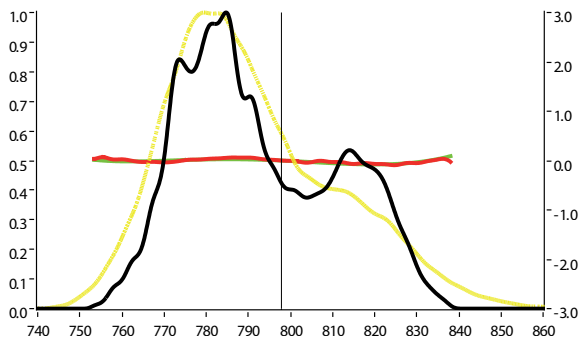# 3rd order & Chaotic Phase

Spectral domain

Time domain

Pulse duration FWHM (*Measured* / *FTL*)   **99,2** / *26,8* fs
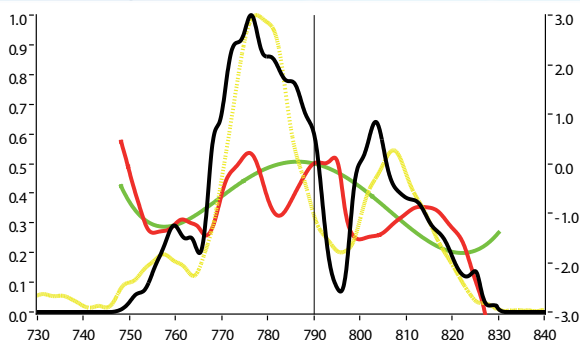
Standard deviation σ (*Measured* / *FTL*)   **53,5** / *16,3* fs

Pulse duration FWHM (*Measured* / *FTL*)   **26,3** / *26,3* fs
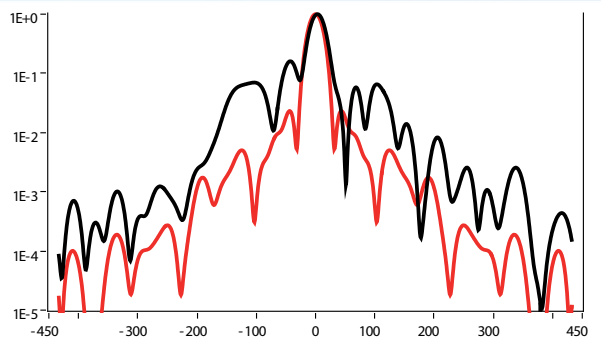
Standard deviation σ (*Measured* / *FTL*)   **16,1** / *15,9* fs

Oscillatory Phase

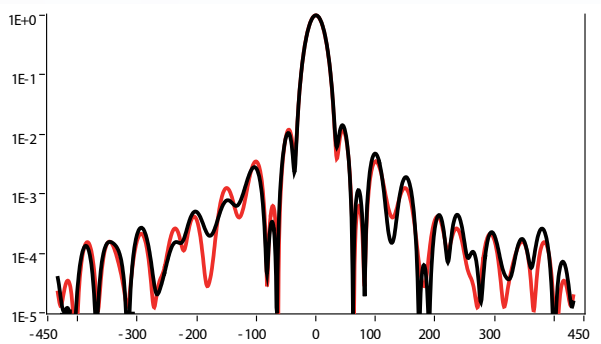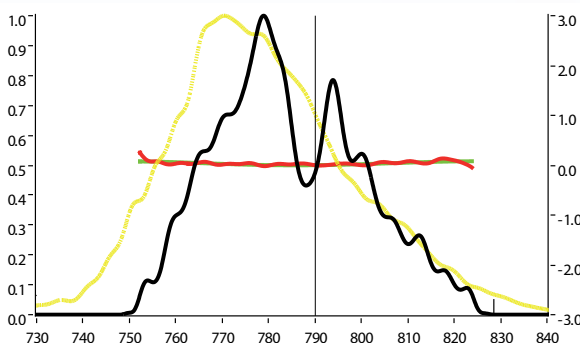## Spectral domain

Time domain

Pulse duration FWHM (*Measured* / *FTL*)   **28** / *26,8* fs
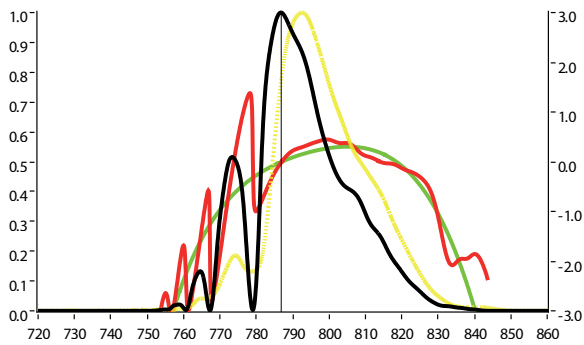
Standard deviation σ (*Measured* / *FTL*)   **59,3** / *26,1* fs
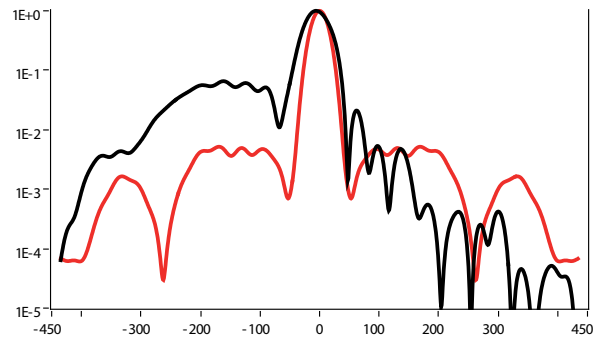
Pulse duration FWHM (*Measured* / *FTL*)   **28,7** / *28,6* fs

Standard deviation σ (*Measured* / *FTL*)   **20,5** / *19,2* fs

Phase jump

Spectral domain

Time domain

*Pulse duration FWHM (**Measured** / **FTL**)*	**44** / **30,9** fs
*Standard deviation σ (**Measured** / **FTL**)*	**71,4** / **42,1** fs
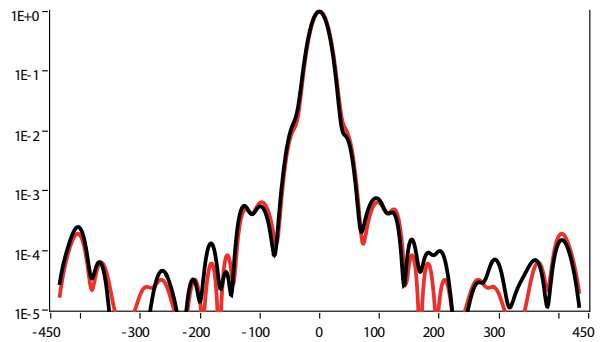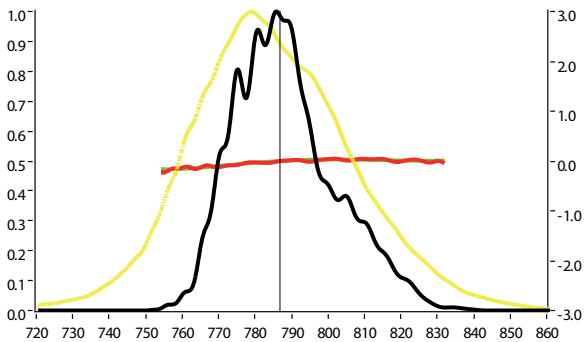
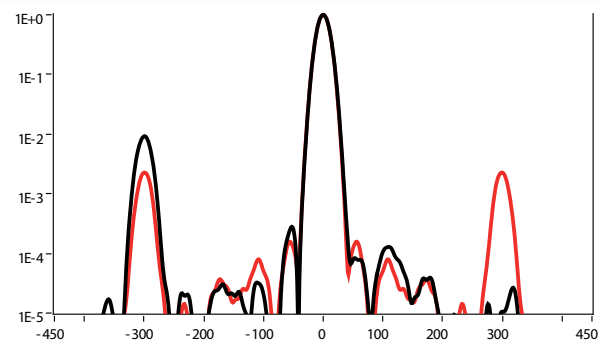|	
*Pulse duration FWHM (**Measured** / **FTL**)*	**30,2** / **30,2** fs
*Standard deviation σ (**Measured** / **FTL**)*	**17,1** / **16,7** fs

Double pulses generated by Dazzler

Starting from a 23fs pulse optimized with the **Wizzler / Dazzler feedback loop**, pre or post pulses are created by the **Dazzler**.
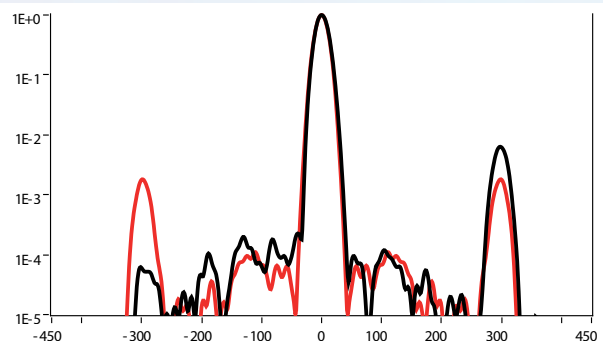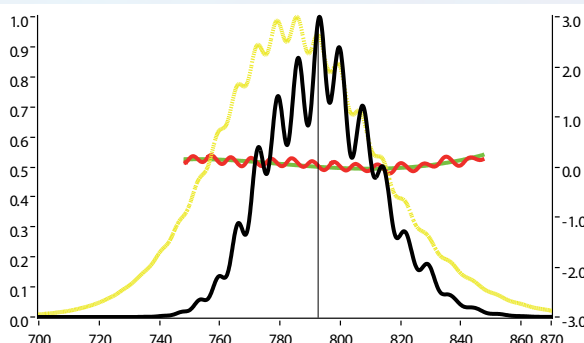
Spectral domain
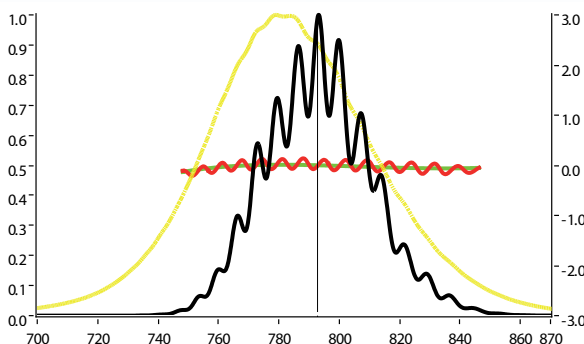
Time domain

Pre-pulse generated 300 fs before the main pulse, with a relative intensity of 1%.

Post-pulse generated 300 fs after the main pulse, with a relative intensity of 1%.