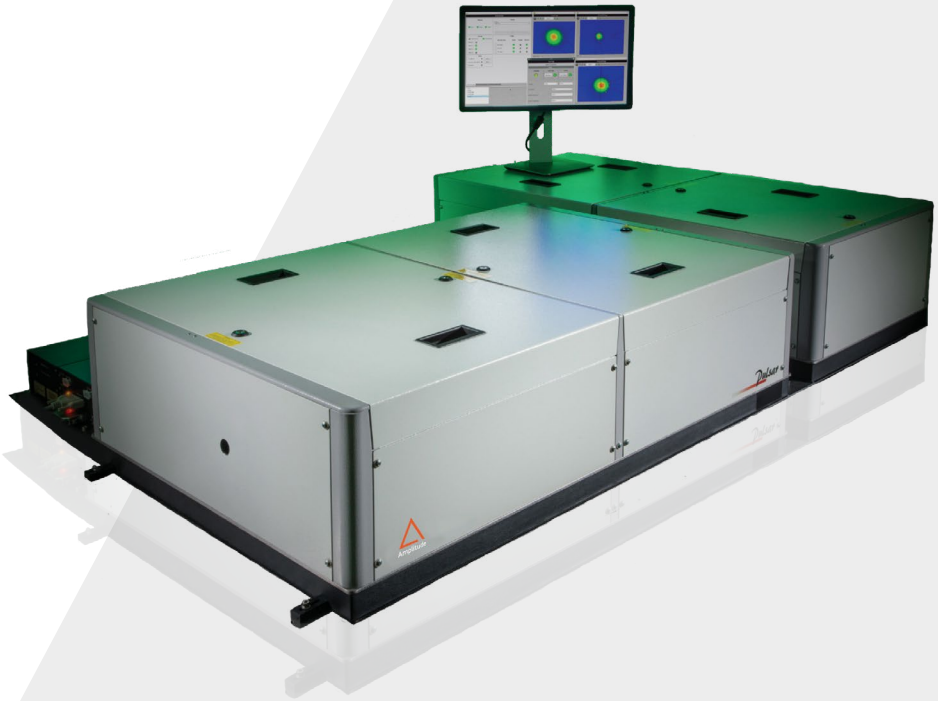
# ARCO

*High energy Ti:Sapphire amplifiers*

*The best of the Ti:Sapphire technology*

Arco - the class of ultra-intense fs laser systems designed as the ideal light source for the most demanding applications. Arco amplifiers offer outstanding performance: best-in-class output parameters packaged in robust, reliable and user friendly configurations.

Arco ultrafast Ti:Sapphire lasers are built on a modular and versatile architecture and cover most exhaustive output parameter range on the ultrafast laser market.



## Applications

**Science:**

> High harmonic generation
> Attophysics
> Spectroscopy
> Filamentation
> Laser wakefield acceleration
> Teraherz
> Plasma study
> Electron generation & acceleration

## Key Features

> 10 Hz, 100 Hz, 1 kHz, 10 kHz repetition rates
> Pulse energy from 1 mJ tp 1.1 J
> Amplitude-made pump lasers
> Most versatile and robust architecture
> Peak power up to 55 TW
> Highest performance in class
> Pulse duration down to 20 fs
> Hybrid systems with dual repetition rate

Amplitude

# Specifications

## ARCO W 10 kHz amplifiers

| | | | |
|---|---|---|---|
| Repetition Rate [1] | 10 kHz | | |
| Energy Per Pulse [2,3] | 0,8 mJ @ 10 kHz | 1,8 mJ @ 10 kHz | 3 mJ @ 10 kHz |
| Pulse Width (fwhm) [4] | < 100 fs or < 35 fs or < 20 fs | | |
| Central Wavelength (nm) [5] | 800 ± 10 | | |
| Average Power (W) | 8 | 18 | 30 |
| Pump Lasers | Mesa | Mesa Duo | Mesa & Mesa Duo |
| Pulse To Pulse Energy Stability (RMS)[6] | 1 % | 1 % | 0,7 % |
| Power Stability (RMS) [7] | 1 % | | |
| Nanosecond Contrast [8] | < $5.10^{-4}$ | | |
| Picosecond Contrast [9] | < $10^{-6}$ @ 300 - 50 ps & < $10^{-6}$ @ 50 - 10 ps & < $10^{-5}$ @ 1 ps | | |
| Beam Quality $M^2$ | < 1.3 | | |
| Pointing Stability | < 10 µrad RMS | | |
| Polarization | Linear horizontal | | |
| Warm-up Time | < 1 hour | | |

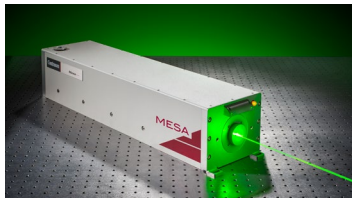
[1] Please contact factory for specifications at other repetition rates
[2] 0.6 mJ / 1.6 mJ / 2.8 mJ @ 10 kHz for pulse duration < 25 fs
[3] Please contact factory for specifications at other energy level
[4] 790 nm +/- 10 nm for 100 fs pulse duration. Other central wavelengths, please contact factory
[5] Factory set, must be specified when ordered and will be optimized prior to shipment
[6] Over 2000 pulses
[7] Over 8 hours under stable environmental conditions
[8] Pre-pulse, regenerative amplifier replicas
[9] Measured with third order cross-correlator (SEQUOIA)

# Options

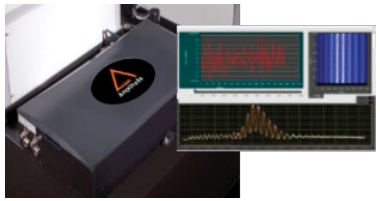
- Carrier envelope phase (CEP)
- Down to 17 fs pulse durations
- External synchronization
- User friendly laser control software

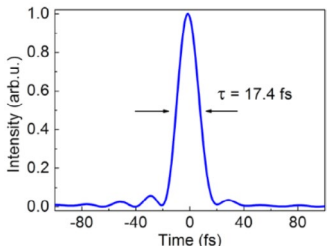
# Accessories

- Energy attenuator
- Active beam pointing control
- Palitra OPA (230 nm - 17 µm)
- SHG, THG, FHG harmonic generators

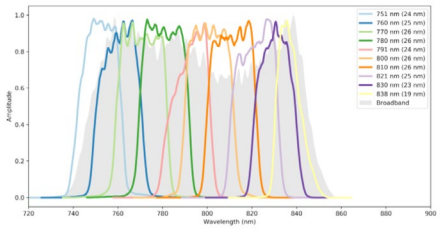


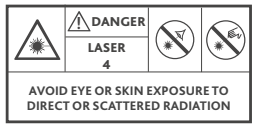
Mesa DPSS Nd:YAG pump laser


BIRD for CEP stabilization and measurement



<18 fs pulse duration


For < 20 fs duration
tunability over 100 nm with Mazzler




# Specifications

## ARCO C (100 Hz) & ARCO M (1 kHz)

| | | | | | | |
|---|---|---|---|---|---|---|
| Repetition Rate [1] | 100 Hz for Arco C | 1 kHz for Arco M | | | | |
| Energy Per Pulse [2,3] | 6 mJ @ 100 Hz | 5 mJ @ 1 kHz | 12 mJ @ 100 Hz | 10 mJ @ 1 kHz | 25 mJ @ 100 Hz | 20 mJ @ 1 kHz |
| Pulse Width (fwhm) [4] | < 100 fs or < 35 fs or < 20 fs | | | | | |
| Central Wavelength (nm) [5] | 800 ± 10 | | | | | |
| Average Power (W) | 5 | | 10 | | 20 | |
| Pump Lasers | Terra | | Terra Duo | | 2 Terra Duo | |
| Pulse To Pulse Energy Stability (RMS)[6] | 0,7 % | | 0,7 % | | 0,5 % | |
| Power Stability (RMS) [7] | 1 % | | | | | |
| Nanosecond Contrast [8] | < $5.10^{-4}$ | | | | | |
| Picosecond Contrast [9] | < 5 $10^{-7}$ @ 300 - 50 ps & < $10^{-6}$ @ 50 - 10 ps & < $10^{-5}$ @ 1 ps | | | | | |
| Beam Quality $M^2$ | < 1.3 | | | | | |
| Pointing Stability | < 10 µrad RMS | | | | | |
| Polarization | Linear horizontal | | | | | |
| Warm-up Time | < 1 hour | | | | | |

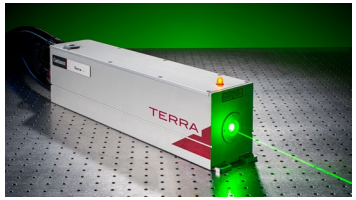
[1] Please contact factory for specifications at other repetition rates
[2] 5 mJ / 9 mJ / 20 mJ @ 100 Hz or 4 mJ / 9 mJ / 16 mJ @ 1 kHz for pulse duration < 25 fs
[3] 790 nm +/- 10 nm for 100 fs pulse duration. Other central wavelengths, please contact factory
[4] Factory-set, must be specified when ordered and will be optimized prior to shipment
[5] Over 2000 pulses
[6] Over 8 hours under stable environmental conditions
[7] Pre-pulse, regenerative amplifier replicas
[8] Measured with third order cross-correlator (SEQUOIA)

# Options

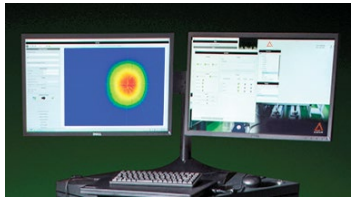
- Carrier envelope phase (CEP)
- Down to 17 fs pulse durations
- External synchronization
- User friendly laser control software

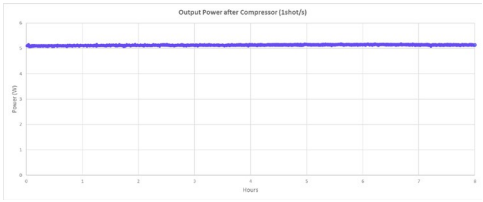
# Accessories

- Energy attenuator
- Active beam pointing control
- Palitra OPA (230 nm - 17 µm)
- SHG, THG, FHG harmonic generators

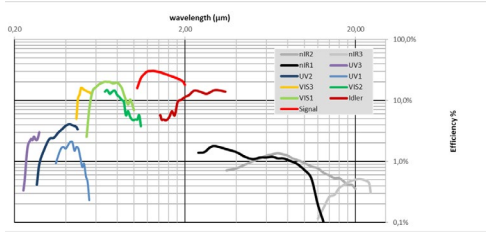


Terra DPSS Nd:YLF pump laser

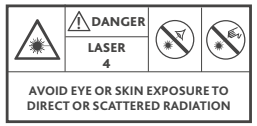

User friendly laser control software



High power stability



Palitra OPA tunability



# Specifications

## ARCO X 10 Hz high energy amplifiers

| | | | | |
|---|---|---|---|---|
| Repetition Rate [1] | 10 Hz | | | |
| Energy Per Pulse [2] | 25 mJ | 100 mJ | 500 mJ | 1,1 J |
| Pulse Width (fwhm) [3] | < 100 fs or < 35 fs or < 20 fs | | | |
| Central Wavelength (nm) [4] | 800 ± 10 | | | |
| Peak Power (max) | 1,25 TW | 5 TW | 25 TW | 55 TW |
| Pump Lasers | Inlite II | Minilite II & Surelite III | Inlite II & Powerlite 2,5 J | Inlite II & Powerlite 2,5 J |
| Pulse To Pulse Energy Stability (RMS)[5] | < 1,5 % | < 1,5 % | < 1,5 % | < 1 % |
| Power Stability (RMS) [6] | 2 % over 8 hours | | | |
| Nanosecond Contrast [7] | $< 5.10^{-4}$ | | | |
| Picosecond Contrast [8] | $< 5\ 10^{-7}$ @ 300 - 50 ps & $< 10^{-6}$ @ 50 - 10 ps & $< 10^{-5}$ @ 1 ps | | | |
| Beam Quality $M^2$ | < 1.5 | | | |
| Pointing Stability [9] | < 10 µrad RMS | | | |
| Polarization | Linear horizontal | | | |
| Warm-up Time | < 1 hour | | | |

[1] Please contact factory for specifications at other repetition rates
[2] PPlease contact factory for specifications at other energy level
[3] Factory-set, must be specified when ordered and will be optimized prior to shipment. Please contact factory for specifications at other pulse duration
[4] 790 nm +/- 10 nm for 100 fs pulse duration. Other central wavelengths, please contact factory

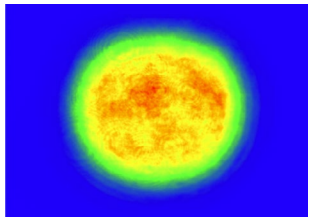
[5] Over 2000 consecutive pulses
[6] Over 8 hours under stable environmental conditions
[7] Pre-pulse, regenerative amplifier replicas
[8] Measured with third order cross-correlator (SEQUOIA)
[9] Over 2000 consecutive pulses

# Options

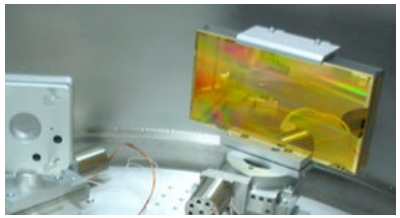
- Vacuum compatible compressor
- Down to 20 fs pulse durations
- External synchronization
- User friendly laser control software

# Accessories

- Energy attenuator
- Active beam pointing control
- Palitra OPA (230 nm - 17 µm)
- Isolation of experimental reflected beam

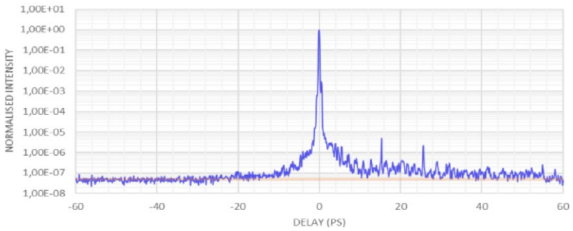


High quality beam profile (500 mJ)

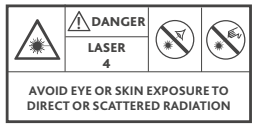


Vacuum compressor for high energy

Genpulse: safety and timing control unit




High picosecond contrast




# Specifications

## ARCO Hybrid Dual 1 kHz and 10 Hz amplifier

| | | | |
|---|---|---|---|
| Repetition Rate [1] | 10 Hz & 1 kHz | | |
| Energy Per Pulse [2] | 4 mJ @ 1 kHz & 25 mJ @ 10 Hz | 4 mJ @ 1 kHz & 100 mJ @ 10 Hz | 4 mJ @ 1 kHz & 500 mJ @ 10 Hz |
| Pulse Width (fwhm) [4] | < 100 fs or < 35 fs | | |
| Central Wavelength (nm) [5] | 800 ± 10 | | |
| Peak Power (max) | 0,7 TW | 2,8 TW | 14 TW |
| Pump Lasers | Terra & Inlite II | Terra & Surelite III | Terra & Inlite + Powerlite 2,5 J |
| Energy Stability (RMS)[6] | 0,7 % @ 1 kHz & 1,2 % @ 10 Hz | 0,7 % @ 1 kHz & 1,5 % @ 10 Hz | 0,7 % @ 1 kHz & 1,5 % @ 10 Hz |
| Power Stability (RMS) [7] | 2 % over 8 hours | | |
| Nanosecond Contrast [8] | < $5.10^{-4}$ @ 1 kHz & < $1.10^{-6}$ @ 10 Hz | | |
| Picosecond Contrast [9] | < 5 $10^{-7}$ @ 300 - 50 ps & < $10^{-6}$ @ 50 - 10 ps | | |
| Beam Quality $M^2$ | < 1,3 | < 1,5 | < 1,5 |
| Pointing Stability | < 10 µrad RMS | | |
| Polarization | Linear horizontal | | |
| Warm-up Time | < 1 hour | | |

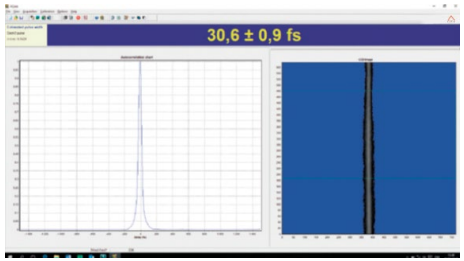
[1] 1 kHz - 10 Hz when 10 Hz output is activated. Please contact factory for specifications at other repetition rates
[2] Please contact factory for specifications at other energy level
[3] 790 nm +/- 10 nm for 100 fs pulse duration. Other central wavelengths, please contact factory
[4] Factory-set, must be specified when ordered and will be optimized prior to shipment
[5] Over 2000 pulses
[6] Over 8 hours under stable environmental conditions
[7] Pre-pulse, regenerative amplifier replicas
[8] Measured with third order cross-correlator (SEQUOIA)
[9] Over 2000 consecutive pulses

# Options

- Two independent compressed beams
- Down to 20 fs pulse durations
- Simultanous 1 kHz & 10 Hz output
- User friendly laser control software

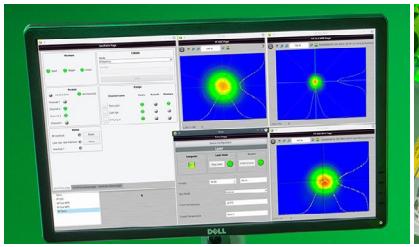
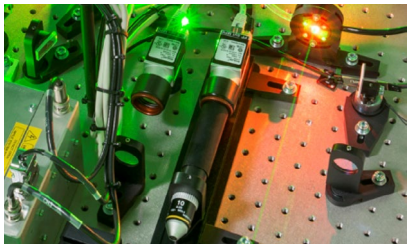
# Accessories

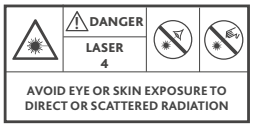
- Energy attenuator
- Active beam pointing control
- Vacuum compatible compressor
- Palitra OPA (230 nm - 17 µm)



Pulse duration < 35 fs

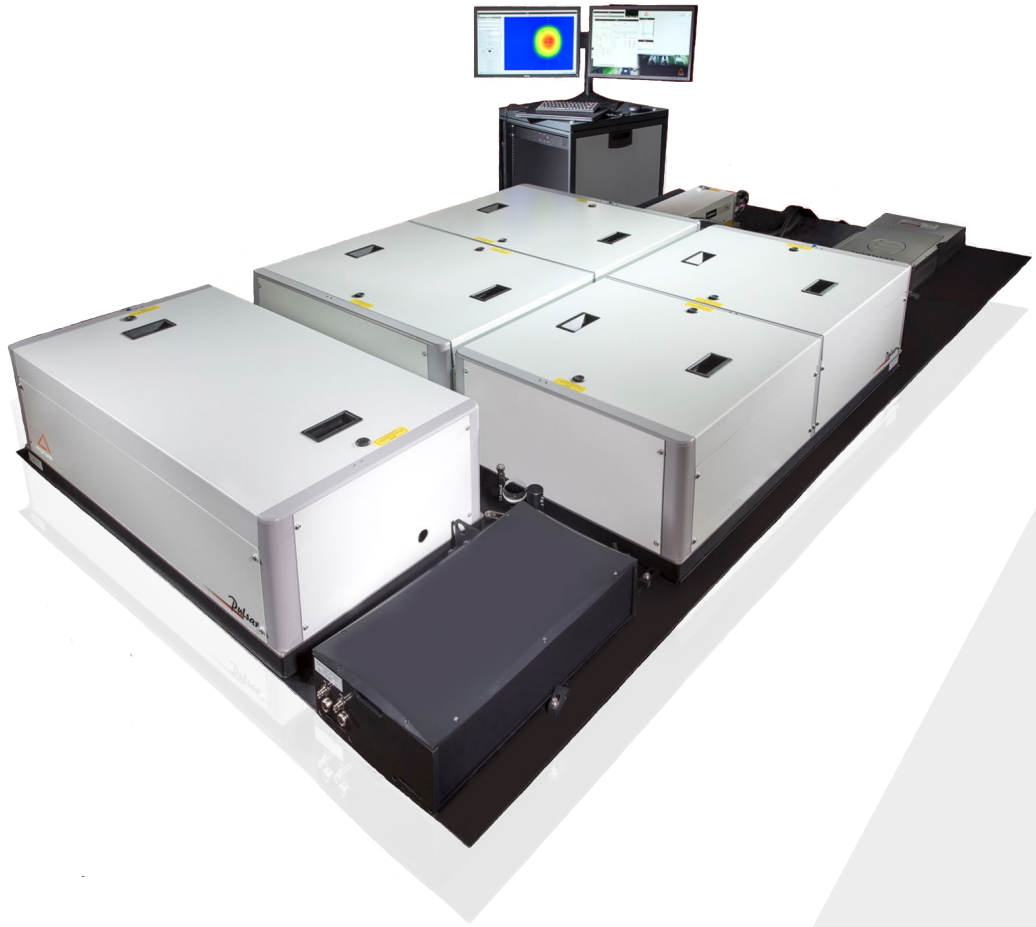
Vacuum compressor for high energy



Laser control software with beam profile monitoring for each amplifier and pump



# ARCO

*Arco amplifiers offer outstanding performance: best-in-class output parameters packaged in robust, reliable and user friendly configurations.*



Amplitude