

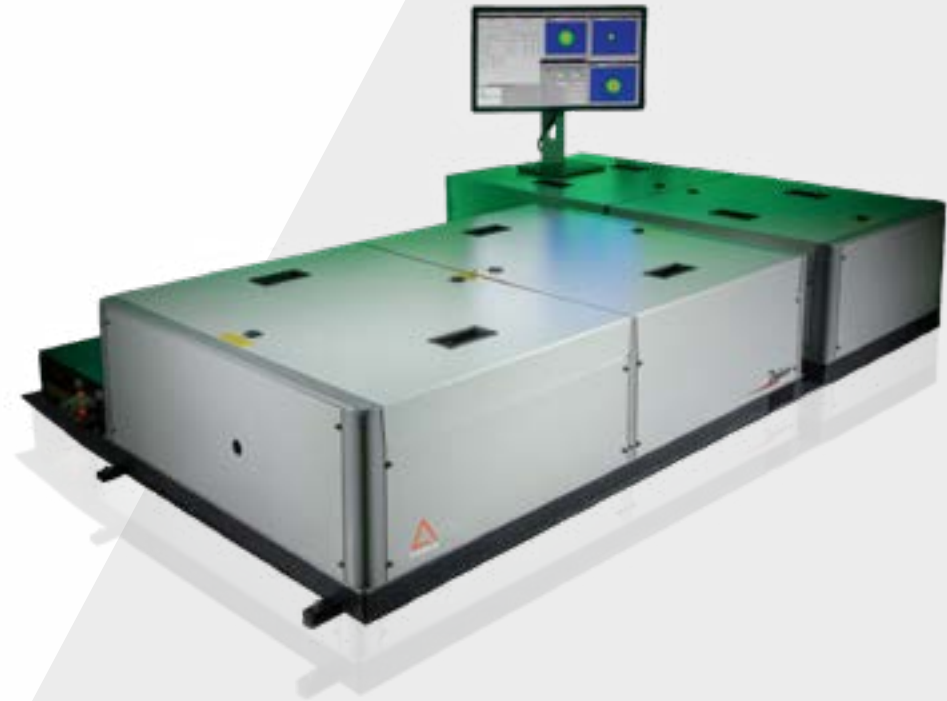
# ARCO

*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
- > Terahertz
- > Plasma study
- > Electron generation & acceleration

## Key Features

- > 10 Hz, 100 Hz, 1 kHz repetition rates
- > Pulse energy from 1 mJ to 2.7 J
- > Amplitude-made pump lasers
- > Most versatile and robust architecture
- > Peak power up to 120 TW
- > Highest performance in class
- > Pulse duration down to 20 fs
- > Hybrid systems with dual repetition rate

# Specifications

## ARCO C (100 Hz)

Repetition Rate	100 Hz		
Energy Per Pulse (mJ) <sup>1</sup>	18 mJ	40 mJ	60 mJ
Pulse Width (fwhm) <sup>1</sup>	< 100 fs or < 35 fs or < 20 fs		
Central Wavelength (nm) <sup>2,3</sup>	800 ± 10		
Pulse To Pulse Energy Stability (RMS) <sup>4</sup>	1 %		
Power Stability (RMS) <sup>5</sup>	1.2 %		
Nanosecond Contrast <sup>6</sup>	< 5.10 <sup>-4</sup>		
Picosecond Contrast <sup>7</sup>	< 5 10 <sup>-7</sup> @ 300 - 50 ps & < 10 <sup>-6</sup> @ 50 - 10 ps & < 10 <sup>-5</sup> @ 1 ps		
Beam Quality M <sup>2</sup>	< 1.5		
Pointing Stability	< 10 µrad RMS		
Polarization	Linear horizontal		
Warm-up Time	< 1 hour		

<sup>1</sup> Please contact factory for other energy and pulse duration level

<sup>2</sup> 790 nm +/- 10nm for 100fs pulse duration. Other central wavelength, please contact the factory

<sup>3</sup> Factory set, must be specified when ordered and will be optimized prior to shipment

<sup>4</sup> Over 2000 pulses

<sup>5</sup> Over 8 hours under stable environmental conditions

<sup>6</sup> Pre-pulse, regenerative amplifier replicas

<sup>7</sup> Measured with third order cross-correlator (SEQUOIA)

## Options

- Down to 20 fs pulse durations
- External synchronization
- Laser 4.0 HE system control software

## Accessories

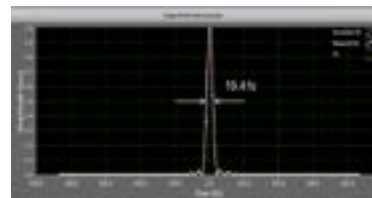
- Energy attenuator
- Active beam pointing control
- SHG, THG, FHG harmonic generators



User friendly laser control software



Dazzler - Acousto-Optic Programmable Dispersive Filter



For < 20 fs duration



## ARCO M (1 kHz)

### Specifications

Repetition Rate <sup>1</sup>	1 kHz		
Energy Per Pulse (mj) <sup>2</sup>	5 mj	10 mj	20 mj
Pulse Width (fwhm) <sup>3</sup>	< 100 fs or < 35 fs or < 20 fs		
Central Wavelength (nm) <sup>4</sup>	800 ± 10		
Pulse To Pulse Energy Stability (RMS) <sup>5</sup>	0.7 %		
Power Stability (RMS) <sup>6</sup>	1 %		
Nanosecond Contrast <sup>7</sup>	< 5.10 <sup>-4</sup>		
Picosecond Contrast <sup>8</sup>	< 5 · 10 <sup>-7</sup> @ 300 - 50 ps & < 10 <sup>-6</sup> @ 50 - 10 ps & < 10 <sup>-5</sup> @ 1 ps		
Beam Quality M <sup>2</sup>	< 1.5		
Pointing Stability	< 10 μrad RMS		
Polarization	Linear horizontal		
Warm-up Time	< 1 hour		

<sup>1</sup> Please contact factory for other energy and pulse duration level

<sup>2</sup> 790 nm +/- 10 nm for 100 fs pulse duration. Other central wavelengths, please contact factory

<sup>3</sup> Factory-set, must be specified when ordered and will be optimized prior to shipment

<sup>4</sup> Over 2000 pulses

<sup>5</sup> Over 8 hours under stable environmental conditions

<sup>6</sup> Pre-pulse, regenerative amplifier replicas

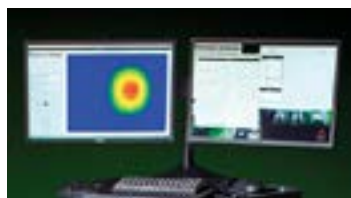
<sup>7</sup> Measured with third order cross-correlator (SEQUOIA)

### Options

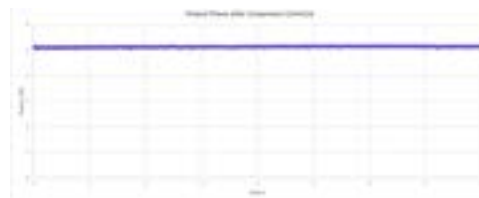
- Carrier envelope phase (CEP) with OPCPA Seeder
- Down to 20fs pulse duration
- External synchronization
- User friendly laser control software

### Accessories

- Energy attenuator
- Active beam pointing control
- SHG, THG, FHG harmonic generators



User friendly laser control software



High power stability



OPCPA Seeder



# ARCO X 10 Hz high energy

## Specifications

Repetition Rate <sup>1</sup>	10 Hz		5 Hz / 10 Hz	
Energy Per Pulse <sup>2</sup>	25 mJ	500 mJ	1 J	> 2.7 J
Pulse Width (fwhm) <sup>3</sup>	< 100 fs or < 35 fs or < 20 fs			
Central Wavelength (nm) <sup>4</sup>	800 ± 10			
Peak Power (max)	1.25 TW	25 TW	50 TW	120 TW
Pulse To Pulse Energy Stability (RMS) <sup>5</sup>	< 1,5 %			
Power Stability (RMS) <sup>6</sup>	2 % over 8 hours			
Nanosecond Contrast <sup>7</sup>	< 5.10 <sup>-4</sup>			
Picosecond Contrast <sup>8</sup>	< 5 10 <sup>-7</sup> @ 300 - 50 ps & < 10 <sup>-6</sup> @ 50 - 10 ps & < 10 <sup>-5</sup> @ 1 ps			
Beam Quality	M <sup>2</sup> < 1.5		Strehl ratio > 0,85 <sup>9</sup>	
Pointing Stability <sup>10</sup>	< 10 µrad RMS			
Polarization	Linear horizontal			
Warm-up Time	< 1 hour			

<sup>1</sup> Please contact factory for specifications at other repetition rates

<sup>2</sup> Please contact factory for specifications at other energy level

<sup>3</sup> Factory-set, must be specified when ordered and will be optimized prior to shipment. Please contact factory for specifications at other pulse duration

<sup>4</sup> 790 nm +/- 10 nm for 100 fs pulse duration. Other central wavelengths, please contact factory

<sup>5</sup> Over 2000 consecutive pulses

<sup>6</sup> Over 8 hours under stable environmental conditions

<sup>7</sup> Pre-pulse, regenerative amplifier replicas

<sup>8</sup> Measured with third order cross-correlator (SEQUOIA)

<sup>9</sup> With deformable mirror option

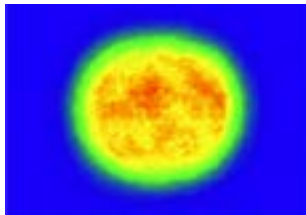
<sup>10</sup> Over 2000 consecutive pulses

## Options

- Vacuum compatible compressor
- Down to 20 fs pulse durations
- External synchronization
- Laser 4.0 HE system control software
- EPICS / TANGO gateway

## Accessories

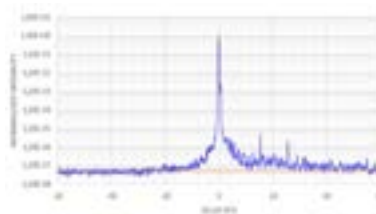
- Energy attenuator
- Active beam pointing control
- Isolation of experimental reflected beam



High quality beam profile (500 mJ)



Vacuum compressor for high energy



High picosecond contrast



Arco X 120 TW



# ARCO Hybrid Dual 1 kHz and 10 Hz amplifier

## Specifications

Repetition Rate <sup>1</sup>	10 Hz & 1 kHz		
Energy Per Pulse <sup>2</sup>	5 mJ @ 1 kHz & 25 mJ @ 10 Hz	5 mJ @ 1 kHz & 500 mJ @ 10 Hz	10 mJ @ 1 kHz & 500 mJ @ 10 Hz
Pulse Width (fwhm) <sup>3</sup>	< 100 fs or < 35 fs		
Central Wavelength (nm) <sup>4</sup>	800 ± 10		
Energy Stability (RMS) <sup>5</sup>	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) <sup>6</sup>	2 % over 8 hours		
Nanosecond Contrast <sup>7</sup>	< 5.10 <sup>-4</sup> @ 1 kHz & < 1.10 <sup>-6</sup> @ 10 Hz		
Picosecond Contrast <sup>8</sup>	< 5 10 <sup>-7</sup> @ 300 - 50 ps & < 10 <sup>-6</sup> @ 50 - 10 ps		
Beam Quality M <sup>2</sup>	< 1.5		
Pointing Stability <sup>9</sup>	< 10 μrad RMS		
Polarization	Linear horizontal		
Warm-up Time	< 1 hour		

<sup>1</sup> 1 kHz - 10 Hz when 10 Hz output is activated. Please contact factory for specifications at other repetition rates

<sup>2</sup> Please contact factory for specifications at other energy level

<sup>3</sup> Factory-set, must be specified when ordered and will be optimized prior to shipment

<sup>4</sup> 790 nm +/- 10 nm for 100 fs pulse duration. Other central wavelengths, please contact factory

<sup>5</sup> Over 2000 pulses

<sup>6</sup> Over 8 hours under stable environmental conditions

<sup>7</sup> Pre-pulse, regenerative amplifier replicas

<sup>8</sup> Measured with third order cross-correlator (SEQUOIA)

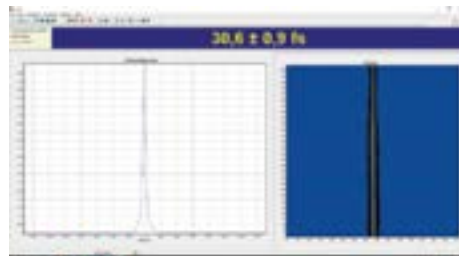
<sup>9</sup> Over 2000 consecutive pulses

## Options

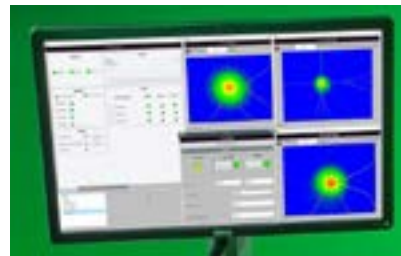
- Two independent compressed beams
- Down to 20 fs pulse durations
- Simultaneous 1 kHz & 10 Hz output
- Laser 4.0 HE system control software
- Vacuum compatible compressor

## Accessories

- Energy attenuator
- Active beam pointing control



Pulse duration < 35 fs



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.*

