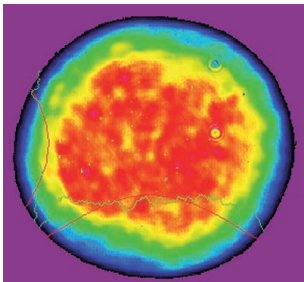


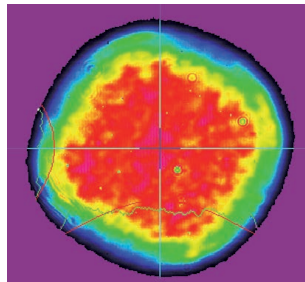
## Compact Folded Resonator Pulsed Nd:YAG laser

### MAIN FEATURES

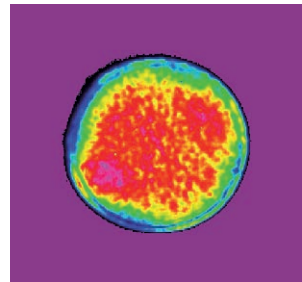
- 1064, 532, 355, 266 nm AND 1.57  $\mu$ m AVAILABLE
- ALIGNMENT GUARANTEED
- QUICK UMBILICAL DISCONNECTS
- COMPACT AND PORTABLE
- GAUSSIAN OR MULTIMODE RESONATORS
- 50 MILLION SHOTS LAMP LIFETIME GUARANTEED
- BUILT TO WITHSTAND HARSH ENVIRONMENTS



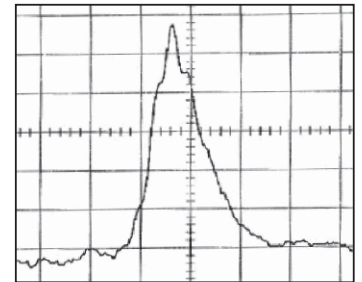
Beam profile in near field  
@ 1064 nm, stable resonator



Beam profile in near field  
@ 532 nm, stable resonator



Beam profile in near field  
@ 355 nm, stable resonator



Temporal profile  
@ 1064 nm, 20Hz

### DIMENSIONS

**Laser head** 3.6kg (8lbs)

- A 323 mm [12.7"]
- B 94 mm [3.7"]
- C 84 mm [3.3"]



**ICE 450 19" rack** 14kg (31lbs)

- A 483 mm [19"]
- B 508 mm [20"]
- C 133 mm [5.25"]



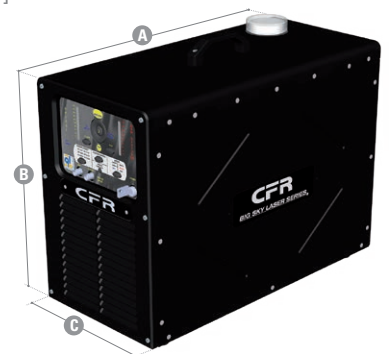
**ICE 450** 14kg (31lbs)

- A 435 mm [17.2"]
- B 360 mm [14.2"]
- C 133 mm [5.25"]



**ICE HRR** 18kg (40lbs)

- A 500 mm [19.7"]
- B 406 mm [16"]
- C 236 mm [9.3"]



ICE : Integrated Cooling and Electronics  
HRR : High Repetition Rate

Others dimensions  
available on:  
[www.quantel-laser.com](http://www.quantel-laser.com)

# CFR

**TOUGH, RUGGED, RELIABLE. SIMPLY EASY TO USE.**

| RESONATOR <sup>2</sup>                   | TEM 00 <sup>1</sup> | CFR 200 |       |       |           |            | CFR 300 |      |    |        |         | CFR 400 |       |     |      |       |        |           |     |     |         |     |  |
|--|---------------------|---------|-------|-------|-----------|------------|---------|------|----|--------|---------|---------|-------|-----|------|-------|--------|-----------|-----|-----|---------|-----|--|
|  |                     | Stable  |       |       |           |            | GRM     |      |    |        |         | Stable  |       | GRM |      |       | Stable |           | GRM |     |         |     |  |
| Repetition rate (Hz)                     | To 100              | To 10   | To 20 | To 30 | *** To 50 | *** To 100 | 10      | 20   | 30 | *** 50 | *** 100 | To 10   | To 20 | 10  | 20   | To 10 | To 20  | *** To 30 | 10  | 20  | *** 30  |     |  |
| Energy per pulse (mJ)                    | 1064 nm             | 10      | 200   |       |           | 125        | 30      | 200  |    | 180    | 100     | 25      | 300   |     | 270  |       |        | 400       |     | 330 | 330     |     |  |
|  | 532 nm              | 6       | 130   |       |           | 70         | 15      | 130  |    |        | 60      | 15      |       |     |      |       |        | 230       |     | 190 | 200**** |     |  |
|  | 355 nm              | 2       | 70    |       | 50        |            | 6       | 70   | 60 |        | 5       |         |       |     |      |       | 90     |           | 80  | 90  | 80      | 170 |  |
|  | 266 nm*             | 1       | 50    |       | 30        |            | 3       | 50   | 50 | 20     |         |         |       |     |      |       |        |           |     |     |         |     |  |
|  | 1.57 µm**           |         |       |       | 35        |            |         |      |    |        |         |         |       |     |      |       | 70     | 65        | 65  |     |         |     |  |
| Energy stability (%) <sup>3</sup>        | 1064 nm             | <3      | <2    | <2    | <3        | <4         | <2      | <2   | <3 | <4     | <2.5    | <2.5    | <2    | <2  |      |       |        |           | <2  |     |         |     |  |
|  | 532 nm              | <4      | <2.5  | <2.5  | <4        | <5         | <2.5    | <2.5 | <4 | <5     |         |         |       |     |      |       | <2.5   |           |     |     |         |     |  |
|  | 355 nm              | <5      | <2    | <3    | <3        | NA         | <2      |      |    | NA     |         |         |       |     |      |       | <2     |           |     |     |         |     |  |
|  | 266 nm*             | <5      | <3    | <3    | <3        | NA         | <3      | <3   |    |        |         |         |       |     |      |       |        |           |     |     |         |     |  |
|  | 1.57 µm**           |         |       |       | <5        |            |         |      |    |        |         |         |       |     |      |       | <5     |           |     |     |         |     |  |
| Pulse duration (ns) <sup>4</sup>         | 1064 nm             | 13      | 13    | 13    | 17        | 14         | 10      | 11   | 18 | 16     | 11      | 11      | 10    | 10  |      |       |        |           | 10  |     | 11      |     |  |
|  | 532 nm              | 14      | 10    | 10    | 16        | 13         | 10      | 10   | 14 | 11     |         |         |       |     |      |       | 9      |           | 10  |     |         |     |  |
|  | 355 nm              | 13      | 11    | 10    |           | NA         | 9       |      |    | NA     |         |         |       |     |      |       | 9      |           | 9   |     |         |     |  |
|  | 266 nm*             | 13      | 10    | 10    |           | NA         | 10      | 10   |    |        |         |         |       |     |      |       |        |           |     |     |         |     |  |
|  | 1.57 µm**           |         |       |       | 14        |            |         |      |    |        |         |         |       |     |      |       | 11     |           |     |     |         |     |  |
| Beam divergence (mrad) <sup>5</sup>      | 1064 nm             | <2      | <4    | <4    | <4        | <3         | <1.5    |      |    |        | <5      |         | <2    |     | <4.5 |       | <5     | <1.5      |     |     |         |     |  |
|  | 532 nm              | <1.5    | <4    | <4    | <3.5      | <3         | <1.5    |      |    |        |         |         |       |     | <4   |       | <4.5   | <1.5      |     |     |         |     |  |
|  | 355 nm              | <1      | <3.5  | <3    |           | NA         | <1.5    |      |    | NA     |         |         |       |     | <3.5 |       | <4     | <1.5      |     |     |         |     |  |
|  | 266 nm*             | <1      | <3.5  | <3.5  |           | NA         | <1.5    |      |    |        |         |         |       |     |      |       |        |           |     |     |         |     |  |
|  | 1.57 µm**           |         |       |       | <12       |            |         |      |    |        |         |         |       |     |      |       | <12    |           |     |     |         |     |  |
| Beam diameter (mm)                       | All                 | <1.5    | <6.35 |       |           | <3         | <6.35   |      |    | <3     | <6.35   |         |       | <7  |      |       |        |           |     |     |         |     |  |
| Pointing stability (µrad) <sup>6</sup>   | All                 |         |       |       |           |            |         |      |    |        |         | 100     |       |     |      |       |        |           |     |     |         |     |  |
| Jitter (+/-ns WRT Q-switch) <sup>7</sup> | All                 | <1      |       |       |           |            | <2      |      |    |        |         | <1      |       |     |      |       |        |           |     |     |         |     |  |
| Q-Switch delay (s) <sup>8</sup>          | All                 |         |       |       |           |            |         |      |    |        |         | 2       |       |     |      |       |        |           |     |     |         |     |  |

\* Crystals used for 266 nm generation exhibit self-heating due to light absorption and the crystal temperature is therefore dependent on the average laser power. The output energy of a 266 nm laser is strongly dependent on the repetition rate and the specified pulse energy will only be provided within a limited range above or below the optimum repetition rate.  
 \*\* Other wavelength upon request. \*\*\* Power supply: ICE HRR. The specifications correspond to the selected primary wavelength. \*\*\*\* Beam diameter of CFR400 GRM 532 nm < 12 mm.  
<sup>1</sup> TEM00 is delivered only with the smaller diameter rod. Energies are engineering values. <sup>2</sup> Stable systems may operate over a wide range of repetition frequencies; GRM lasers may not have such flexibility.  
<sup>3</sup> Variation from mean for 99% of shots (RMS). <sup>4</sup> FWHM. +/-2ns. <sup>5</sup> Full angle, 99% of shots. <sup>6</sup> Angle containing 86.5% Energy. Other methods can predict lower values for GRM systems  
<sup>7</sup> Measured from Q-Switch Sync. Output. <sup>8</sup> Disables Q-Switch until after resonator has stabilized.

**OPTIONS**

- Wavelength separation packages: two or three apertures on request (WS2 or WS3), high spectral purity (WSP).
- Motorized Variable Attenuator (MTA) for IR (installed in the laser head). Specified 1064 nm energy will be decreased by as much as 20 %. Manual (MNA) version on request.
- ICE 450 19" rack.

**Note on Beam Divergence:**  
 Quantel pioneered beam measurement software and measures divergence as an angle containing energy. For GRM systems, this returns a figure which is larger than that given using alternative criteria.

<sup>1</sup> Optional dual dichroic (WS2/WS3)  
<sup>2</sup> Optional quad dichroics (WSP)  
<sup>3</sup> Specifications applying to all 1064 nm laser head systems  
<sup>4</sup> For IR laser head only.  
 Temperature performance available upon request for higher harmonics.

| RESONATOR CONFIGURATION                          | CFR / ICE450  | CFR / ICE HRR                                    |
|--|---|--|
| 1064 nm  | Linear  |  |
| 532 nm   | Vertical  |  |
| 355 nm   | Vertical  |  |
| 266 nm   | Vertical  |  |
| 1.57 µm  |   |  |
| <b>SPECTRAL PURITY (%)<sup>1</sup></b>           |   |  |
| 532 nm   | > 97  |  |
| 355 nm   | > 90  |  |
| 266 nm   | > 85  |  |
| <b>HIGH SPECTRAL PURITY (%)<sup>2</sup></b>      |   |  |
| 532 nm   | > 99.5  |  |
| 355 nm   | > 99.5  |  |
| 266 nm   | > 99  |  |
| <b>ENERGY DRIFT OVER 8 HOURS (%)<sup>3</sup></b> | < 10  |  |
| <b>OPERATIONAL<sup>4</sup> TEMPERATURE RANGE</b> | 10°C to 40°C  | 18°C to 28°C                                     |
| <b>STORAGE TEMPERATURE RANGE</b>                 | 5°C to 70°C   | NA   |
| <b>FLASHLAMPS LIFETIME</b>                       | > 50 million shots  |  |
| <b>MAX. ALTITUDE</b>                             | 3000 m [10,000 feet]                                      |  |
| <b>SERVICE REQUIREMENT</b>                       | 100 – 240 V<br>10 A<br>50 – 60 Hz<br>Single phase         | 200 – 240 V<br>5 A<br>50 – 60 Hz<br>Single phase |
| <b>CABLE LENGTH</b>                              | 3 m [9.84 feet]<br>(other lengths available upon request) |  |



For more detailed technical drawings, please visit [www.quantel-laser.com](http://www.quantel-laser.com)



Lumibird has locations across the globe that are available to provide support for any product, service or inquiry. Visit [www.lumibird.com](http://www.lumibird.com) to connect with any of our global sites.

