

The CUNY Center for Advanced Technology In Photonics Applications (CUNY CAT)  
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## Compact High-Power Single-Frequency Monolithic Q-Switched Laser

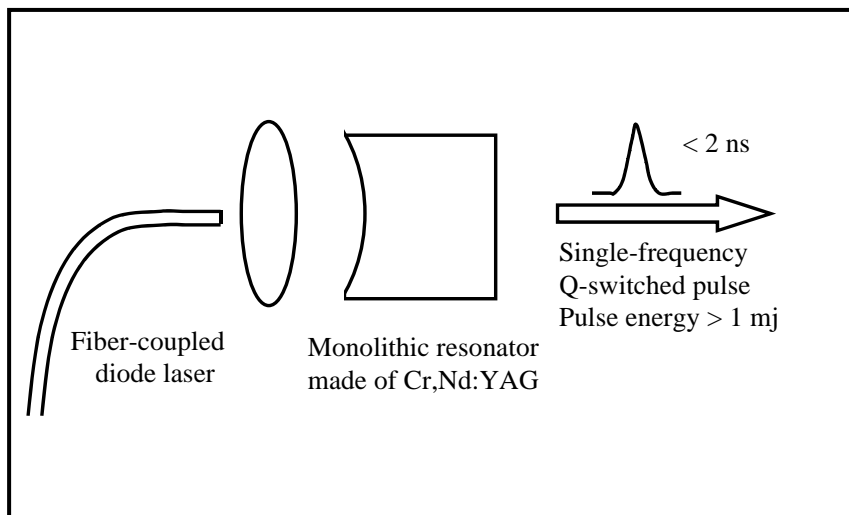
The Q-switched Cr, Nd:YAG laser generates intense, single-frequency laser pulses in a transform-limited spectral linewidth-pulse duration product. The pulse energy is on the order of millijoules and can be scaled up with increasing volume. The typical pulse duration is on the order of nanoseconds.

### Applications:

- High-resolution laser spectroscopy
- Ranging
- Harmonic generation
- Pulsed injection seeding
- Micro-machining

### Benefits:

- Monolithic laser cavity
- Extremely stable
- Single longitudinal mode
- Single transverse mode



### The Technology:

The laser device consists of a single-crystal Cr, Nd:YAG crystal in which chromium ions act as the saturable absorber for the neodymium laser emission. Mirrors are end-surface coated. The laser material performs all the functions of the conventional laser cavities, such as light modulation, frequency selection, transverse mode control, and polarization selection. This results in a self-contained laser with no moving parts. Varying the material composition and physical dimension can control the pulse duration, of the order of several nanoseconds. The self-induced grating inside the gain medium ensures single-frequency operation.

This technology opportunity sheet describes continuing efforts in this area. Several patents may have been issued or are pending and which may be available for licensing.

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