

# Photonics Industries's Ultrafast Attosecond Pump Lasers

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**Synopsis:** Photonics Industries manufactures a variety of pump lasers for ultrafast and attosecond research.

Photonics Industries (PI) has extensive experience with high pulse energy Nd:YLF being the one of first company to deliver commercially available high pulse energy, Nd:YLF, multi-mode lasers capable of producing >25mJ back in 1993. Today, PI has delivered 80W TEM00 mode YLF lasers. Such high pump powers allow high Ti:Sapphire outputs. In all toll, PI has more than 16 years manufacturing commercially viable, high power multi-mode lasers.

PI has exclusive patented technology with many patents issued and patents pending, resulting in 2-3x more pulse energy/pulse than comparable systems. PI's patented single pump chamber in a single resonator head is the simplest designed platform with minimal components. Our proprietary **Intra-Cavity Harmonic Generation** enables high conversion efficiency - up to 100% to the second harmonic. Intra-Cavity Harmonic Generation also enables highly reliable, superior average power stability, extremely stable energy stability <1% rms, which are relatively insensitive to ambient temperature changes that affect harmonic conversion efficiencies resulting from changes within laser cavity. In addition to this greater stability, these pump lasers have a short warm up time, all in a more compact, simpler system design.

This patented technology also enables PI to have higher pulse energies without having increased component damage. For example, PI offers the highest pulse energy green or IR kHz rep rate pump lasers - up to 60mJ per pulse @ 1 kHz in Nd:YLF green.

These pump lasers are also available in Nd:YAG, as well as, Nd:YLF. Nd:YAG enables higher power at higher pulse rates (i.e., up to 300W @ 10 kHz in the IR), (see Fig. 1).

For even higher rep rate pumping (e.g., up to ~100 kHz), Photonics industries offers up to 30W TEM00 green lasers.

All of these ns pulse width pump lasers laser have substantially narrower pulse duration enabling higher peak powers. However, Photonics Industries also offers ~25 ps pulse width pico second lasers with high pulse energies up to 5mJ enabling extremely high peak powers.

Photonics Industries also manufactures a variety of fixed and tunable lasers at both eye-safe wavelengths (i.e., in 3.4 to 1.5um range), as well as, 1.06 μm down to 193 nm wavelengths.



**Fig. 1.** DM Series Pump Laser and Controller.

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