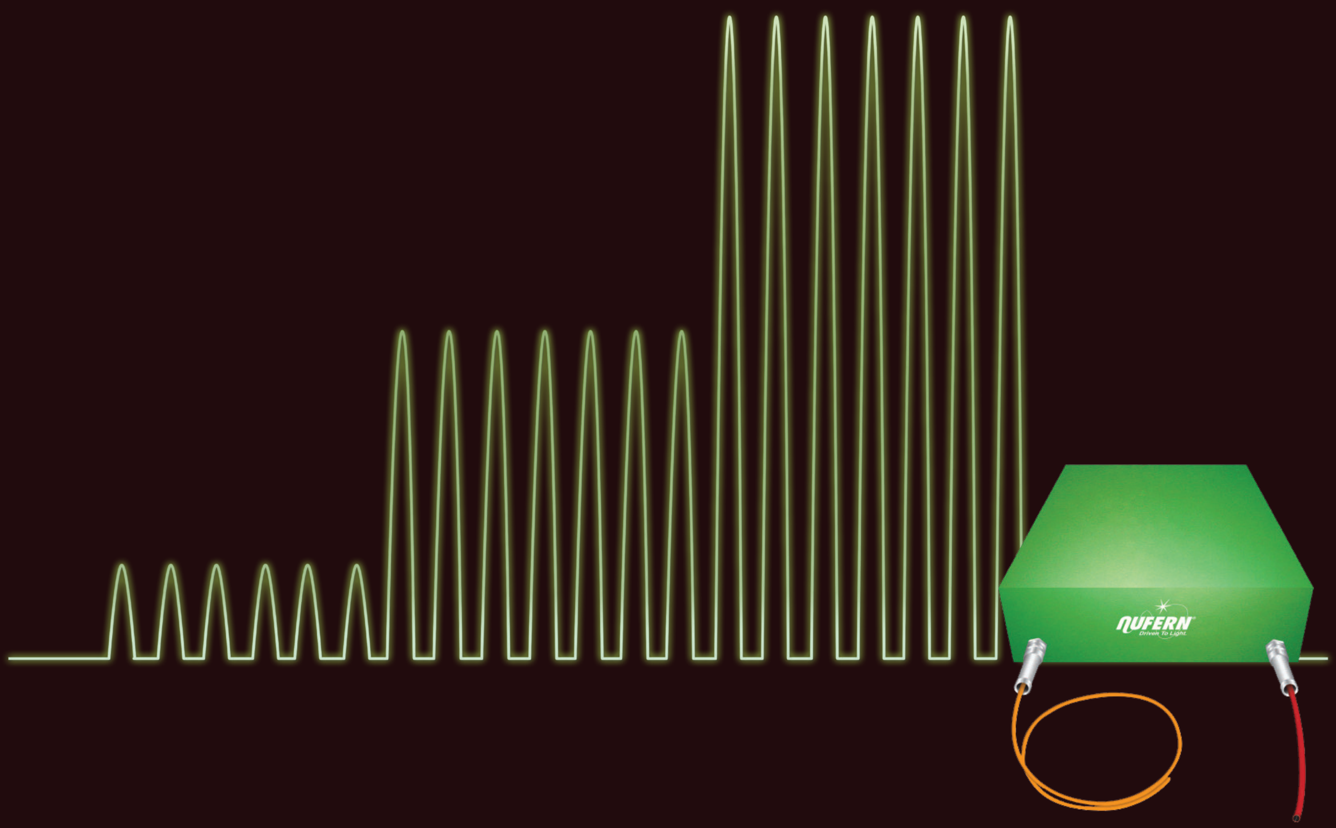
NuAMP™



Single Frequency, Monolithic, PM **Fiber Amplifiers**

Gain the Advantage

NuAMP fiber amplifiers simplify the most complex optical amplification, signal gain, and power scaling challenges. Powered by Nufern's double clad fibers, NuAMP devices offer high stability and high power while preserving critical seed laser characteristics. Now offering extended operating wavelengths, the compact, monolithic package integrates easily into your program, reducing costs and time to completion.

COHERENT® | NUFERN®

Optical Attributes

- High signal isolation & amplification fidelity
- Very narrow linewidth (few kHz)
- Low RIN, high SNR, high PER
- High beam quality, near diffraction limited
- High open loop stability

Mechanical & Electrical Attributes

- Easy controls; Quick start
- High immunity to shock and vibration
- Simple, fast & effective protection system
- Low power consumption, high efficiency

	Feature	Benefits
Output Power	2W, 5W, 10W, 15W, 30W, 50W	Higher power option.
Signal Input Power	> 1 mW ~ 200 mW	Compatible with more low-cost seed sources.
Input Power Loss Protection	Integrated	Lowest risk of catastrophic failure.
Output Power Monitor	Integrated	Continuous system feedback.
Operating Wavelength	1064 nm - 1083 nm	Compatible with standard seed sources.
Output Isolation	Various options available	Same application flexibility.
Back Reflection Protection	Integrated	Lowest risk of catastrophic failure.
Diode Drivers	Integrated	Reduces cost and complexity of lab.
SBS at Rated Power	Reduced SBS	Lowest noise measurements possible.
PC Control	Optional via USB	Easier to set up and use.
E-stop & Key Switch	Included with controller unit	Easier, safer installations.
Remote Interlock	Standard	Easier, safer installations.
Armored Output Cable	Standard	Better accidental damage tolerance.

Application - Ultracold Atomic Physics

The MIT-Harvard Center for Ultracold Atoms (CUA), routinely uses fiber amplifiers to trap quantum degenerate gases in to study the interaction effects on the evolution of these clouds. Figure 1 shows a time of flight picture of a Bose-Einstein Condensate of ^{41}K that was loaded into an optical dipole trap. This trap was formed by a 5 W laser beam produced from a Nufern fiber amplifier and has a beam waist of 150 µm. The temperature of this cloud was about 400 nK and was held in the optical trap for ~2 s before imaging. This imposes an extreme stability requirement on the trapping laser beams for the heating rate to be suppressed below a few nanokelvin per seconds.

In the experiments, the interaction between atoms was manipulated using Feshbach resonances which were induced by exposing the trapped atoms to a uniform magnetic field. An example of a Feshbach resonance between two isotopes of potassium, ^{41}K and ^{40}K is shown in Figure 2. The trapping potential was created by two 100 µm crossed laser beams at λ =1064 nm using a 40 W Nufern fiber amplifier.

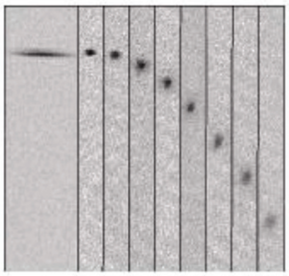


Figure 1 - Time of flight expansion of a Bose Condensate (BEC). Images of the BEC are taken in 2 ms intervals after suddenly turning off the optical trap and allowing the atoms to freely expand.

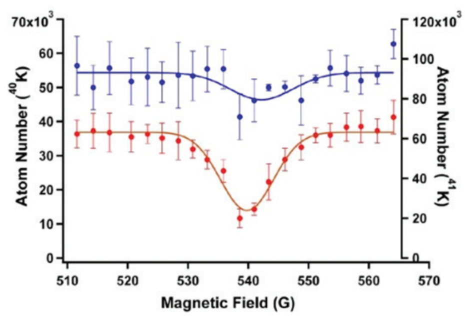


Figure 2 - Feshbach scan of ^{41}K-^{40}K bose-fermi mixture loaded into an optical trap. Blue and red data points represent ^{41}K and ^{40}K atom number after 3 s of hold time in the dipole trap exposed to a uniform external magnetic field.

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Capabilities and typical design parameters are described above. Various standard and OEM designs are available.