

# Compact Diode-Pumped Nd:YLF Laser with Triple-Wavelength Emission

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Here we present a compact and cost-effective Nd:YLF laser, capable of operating with either single- or multi-wavelength emission at 1047 nm, 1321 nm, or 1370 nm. The Nd:YLF crystal is side-pumped by a 797 nm emitting diode stack in a single-bounce resonator, featuring a concave highly reflective mirror with a radius of curvature of 8 m and a plane output coupler. The transmission of the laser mirrors is carefully selected to favor emissions with lower cross-sections, while still providing enough reflection for wavelengths with higher absorption. Through this technique alone, it was possible to select each wavelength or a combination thereof simply by aligning one laser mirror.

This approach not only excels in terms of versatility, enabling multiple applications within the same laser setup, but also introduces innovative wavelength emission at 1370 nm. To the best of our knowledge, this represents the first reported instance of a transversally-pumped Nd:YLF emitting at this wavelength. This new wavelength holds great promise, primarily due to its proximity to the eye-safe region of the spectrum that can be achieved by additional Raman conversion. This characteristic opens a diverse range of potential applications, including Light Detection and Ranging (LIDAR), and range finding.

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