Frequency-Narrowed High-Power Diode Laser Array Method and System

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a method and device for producing a very narrow spectrum from a high-power diode laser array.

OVERVIEW

An important proven use for high-power diode lasers is to produce laser-polarized gas for magnetic resonance imaging applications. Currently, high power diode laser array systems put out only a fraction of the desired wavelength. For example, a 15-watt diode array may only put out one or two watts of usable power.

THE INVENTION

UW–Madison researchers have developed a high-power diode laser array system that uses an external cavity to narrow the spectral width, changing the output power from a broad spectrum to a very narrow spectrum. The light from each emitter is collimated, reflected off a diffraction grating and imaged back onto the emitter. This causes each diode to preferentially lase at the wavelength that is fed back. The result is a diode laser array that uses a much greater portion of the laser's output power.

APPLICATIONS

• Production of laser-polarized gas for MRI
• Can be used to frequency narrow and tune commercial diode laser arrays

KEY BENEFITS

• Successfully tunes and narrows a true multiple-element array (via optical feedback).
• Lets the user adjust and set the level of feedback, which allows maximum tunability, maximum output power and a combination of tunability and output power.
• The small curvature of linear arrays called “smile” can be compensated for using this system.
• Can be extended to stacks of diode array bars, such as those that are currently used
to provide 100 W.

ADDITIONAL INFORMATION

Tech Fields
Medical Imaging - MRI
Analytical Instrumentation - Lasers

CONTACT INFORMATION

For current licensing status, please contact Emily Bauer at emily@warf.org or 608-960-9842.