Low-Cost, High-Power Laser for Analytical and Other Applications

SUMMARY

There are many analytical technologies that could benefit from the development of simple, low-cost lasers capable of providing relatively high-power with stable mode-locking and adjustable pulse widths and frequencies. A novel laser system based on solid-state crystalline Yb:KGW hosts powered by low-cost laser diodes was recently developed at Pacific Northwest National Laboratory. Mode-locked operation of the new system providing more than 10 watts of energy at 1039 nm with a 290 femtosecond pulse width has been demonstrated. The pulse width of the new laser can be easily adjusted from 134 to 433 femtoseconds. A Saturable Absorbable Mirror (SAM) provides self-starting operation. Presently demonstrated powers are higher than a Ti:Sapphire ultrafast laser and the system does not require a high-quality visible pump laser.

The laser diodes and other components of the system are relatively low-cost, indicating that the system can probably be manufactured for a cost of less than $30,000 and possibly less than $20,000. Assuming appropriate markups, a highly tunable laser system capable of delivering power of 10 watts or more in a price range of $60,000 should directly benefit analytical techniques such as two-photon microscopy and non-linear spectroscopy by reducing their initial costs and thus, increasing their availability.

RELATED LINKS

» Published Article
  Mode-locked Yb:KGW laser longitudinally pumped by polarization-coupled diode bars
  Optical Society of America, August 2006
Patents & Intellectual Property
» Patent #: 7457328

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