

PHOTONICS

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Silicon Laser is Realized

“At the University of California, Los Angeles, scientists have reported the demonstration of what they believe to be the first silicon laser, a feat that exploits the Raman effect.”

“Ozdal Boyraz and Bahram Jalali have described pulsed Raman laser emission at 1675 nm with a 25-MHz repetition rate, using a silicon waveguide as the gain medium. The laser has a clear threshold at 9W of peak pump pulse power and slope efficiency of 8.5 percent.”

“Jalali, a professor of electrical engineering at the university’s Henry Samueli School of Engineering and

Applied Science, explained that it uses the natural atomic vibrations of silicon to create or amplify light. In contrast, the other methods rely on electronic transitions, which demand a material with a direct electronic band structure.”

“Silicon does not have this, and so many groups tried adding impurities or developing complicated device structures,” he said. “With our approach, we do not need this.”

“Potential applications include a tunable laser source for biochemical detection, free-space optical communication and defense applications,” he said. “A key attribute of the new technology is that it can produce mid-infrared radiation without any cooling.”