Generation of Discretely Tunable Lasers
From some Gases and Liquids using stimulated Raman scattering (SRS)

By
JAMAL FERNAS MOHAMMED AL-MARASHI

ABSTRACT

Stimulated Raman scattering (SRS) production from gases and liquids were studied. For gases, the SRS production from hydrogen gas (H₂) and ethylene gas (C₂H₄) and their parameters affected the production were measured. The SRS lines from H₂ was obtained at different input energies at \( \lambda = 532 \) nm and found to be 683 nm (Stokes line) and 435 nm (anti-Stokes line). The behavior of these lines are studied under different experimental parameters (input energy and gas pressure). Also, the Stokes line broadening was investigated due to different gas pressure.

The production of SRS lines from ethylene gas under different input energies and pressures were studied. The Stokes line from ethylene for input energy at \( \lambda = 532 \) nm was obtained, and found to be 632 nm under our experimental conditions.
The generation of SRS from organic liquids (acetic acid, formic acid, methylene chlorid and tetrahydrofuran) was investigated with different parameters. The liquids under study shows Stokes line at \( \lambda = 632 \) nm for all when pumped with 532 nm. Only an anti-Stokes line at \( \lambda = 460 \) nm observed for formic acid and methylene chlorid.

When the excitation wavelength 355 nm used to pump the liquids, acetic acid, formic acid and methylene chlorid, Stokes line at \( \lambda = 396 \) nm was generated. There is no anti-Stokes line was observed from the above mentioned liquids.

Jun 2006