

THz lasing from donor centers in uniaxially stressed silicon.

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Recent results of experimental and theoretical studies of THz stimulated emission from optically excited group-V shallow donor centers (P, Sb, As, Bi) in uniaxially stressed silicon are reviewed and discussed.

Low-temperature intracenter phonon-assisted relaxation responsible for the population inversion of bound excited states, the lifetime of principle states and small signal gain available on donor intracenter transitions are considered.

The summary of the laser performance differed for differing donor centers is analyzed. Special attention is paid to the effects of essential enhancement of small signal gain, laser threshold diminution and switching of the laser transition in As donor under the strain (Fig. 1).

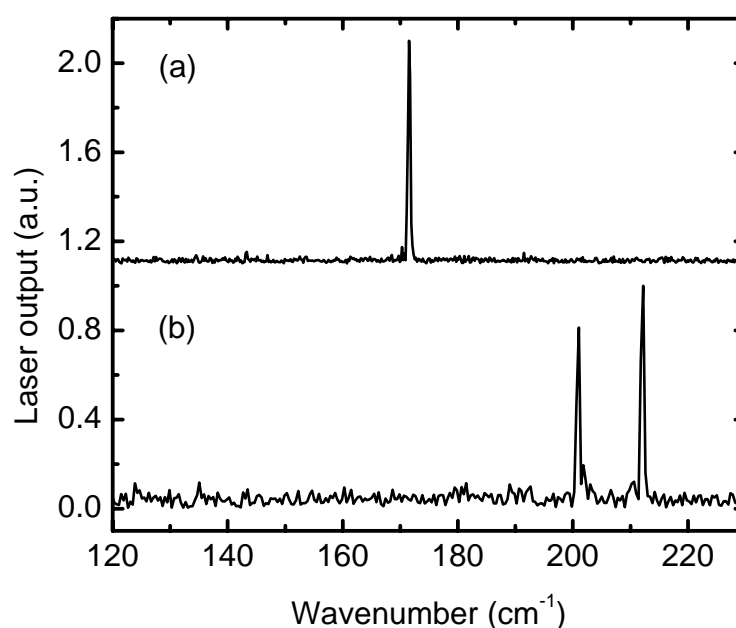


Fig. 1. Stimulated emission spectra of optically excited (10.6 μm) Si:As with (a) and without (b) uniaxial strain (1 kBar) along [031] crystallographic orientation .

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