355. Title:Terahertz emission from GaAs films on Si(100) and Si(111) substrates grown by molecular beam epitaxy

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Abstract:We report on the terahertz emission from femtosecond-laser-irradiated GaAs layers grown on Si(100) and Si(111) substrates. The results show that the terahertz emission from GaAs on Si is stronger than that of a semi-insulating bulk GaAs crystal. This increase is attributed to the strain field at the GaAs/Si interface. In the GaAs of the Si(100) sample, the stronger terahertz emission is observed compared with GaAs on Si(111). Moreover, the effect of changing the doping type of the Si substrate from n-type to semi-insulating was also studied and it was found that the terahertz emission intensity of GaAs on semi-insulating Si(100) is stronger than that of GaAs on n-type Si(100). Finally, strong terahertz emission from GaAs on semi-insulating Si(100) was observed not only in the reflection geometry but also in the transmission geometry. These results hold promise for new applications of terahertz optoelectronics.