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Title:Manufacture of SPASER amplifier with metal-insulator-metal structure

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Abstract:In order to research the integration surface plasmon amplification by stimulated emission of radiation (SPASER) amplifier for surface plasmon (SP) amplification, the basic components of amplifier which includes metal-insulator-metal (MIM) structure embeded by the saturation absorber are designed and discussed. According to the basic principle of SPASER, stimulated emission conditions are analyzed. Meanwhile, the fabrication process of amplifier and pump pulse are designed, and the performance index is given. The results show that under the conditions of the incident light wavelength of 566 nm, pump light wavelength of 532 nm and the length of amplification region of 1-1.5  $\mu\text{m}$ , the pulse response time can reach 100 fs, the bandwidth of 1.5-2 THz and gain of SP-ranges from 30 to 60. SPASER amplifier research will provide theoretical and technology foundation for large-scale integrated photonic chip, which will be widely used for high-speed communications system in next generation.

Number of references:21

Main heading:MIM devices

Controlled terms:Amplification - Electromagnetic wave polarization - Nonlinear optics - Optical pumping - Plasmons - Quantum optics - Stimulated emission

Uncontrolled terms:Basic principles - Fabrication process - High-speed communications - Incident light - Integrated photonics - Metal insulator metals - Metal-insulator-metal structures - Performance indices - Pulse response - Pump light - Pump pulse - Relaxation oscillation - Surface plasmon polaritons - Surface plasmons

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