equation, the study examines how laser radiation parameters, with a wavelength of 1064 nm and a pulse duration of 10 ns, affect the heating process. For a 0.5 mm^2 area and the specified laser parameters, the threshold intensity at which material modification begins aligns with experimental data. Results highlight the gold layer's important role in enhancing heat distribution and improving crystallization. This study will aid in optimizing laser parameters for the experimental synthesis of nanocrystalline silicon via metal-assisted crystallization.

Electromagnetic properties of AgNi/MWCNT-PMMA composites in THz range

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In this work the electromagnetic properties of AgNi/MWCNT-PMMA composites, obtained by coagulation precipitation of polymethyl methacrylate and multi-walled carbon nanotubes modified with AgNi nanoparticles, were observed in terahertz frequency range (0.1–1 Thz). That composites are perfect candidates as EMI shielding materials in microwave range, so their investigation in THz range is promising for various shielding applications in this range.
It was shown, that modification of MWCNTs with AgNi nanoparticles led to a decrease in percolation threshold and an increase in conductivity and shielding effectiveness in broadband frequency range. At the same time, the real part of permittivity is decreasing from 8 to 5 while the conductivity is increasing from 35 to 135 Sm/m with increasing frequency from 0.2 to 1 THz. The most effective filler is 100 % Ag, due to its higher conductivity compared to Ni nanoparticles. Thus, AgNi/MWCNT-PMMA are promising for THz applications, in particular, as EMI shielding materials.

Superradiance in ultrashort pulse reflection signals taking into account the Bloch-Siegert shift

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The effect of sample thickness and Bloch-Siegert shift on the reflection signal of resonant ultrashort pulses is investigated. In particular, the superradiance that is formed in this signal is studied. To take into account the effect of the Bloch-Siegert shift, numerical methods for solving the Maxwell-Bloch equations without the rotating wave approximation were used. It is demonstrated that in thinner samples, superradiance is formed at shorter times. It is found that one of the factors that affects the moment of formation of the superradiance maximum is the Bloch-Siegert shift, since it prevents a complete inversion of the two-level system when exposed to a π pulse.

Tenth order correction to the lepton anomaly from some bubble-type diagram

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Analytical expressions for the tenth-order electromagnetic correction to the lepton ($L = e, \mu, \tau$) anomaly, a_L, are derived explicitly for the Feynman diagram involves the vacuum polarization insertion of four closed lepton, three of which are formed by a lepton L of the same kind as the external one. A method based on consistent application of the dispersion relations for the polarisation operator and the Mellin--Barnes transform for propagators of massive particles, was presented in our previous papers. The result is expressed in terms of the mass ratio $r = m_\ell / m_L$. From the exact analytic expressions we find the asymptotic expansions at $r \to 0$ and $r \to \infty$ and compare them with the corresponding expansions known in the literature. We estimate the interval for the mass relation in which the approximate expansions practically coincide with the exact formulas.