PHYSICS

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STUDY OF THE RAMAN AMPLIFICATION PARAMETERS IN PHOTONIC CRYSTALS

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Multilayered metal-dielectric structure of the Raman amplifier for optical signals made of alternate layers of active metal medium and passive dielectric – optical photonic crystal has been studied. The active medium appears from the effect of the stimulated Raman scattering on the photonic bandgap border of the photonic crystal. The pump wave has the Stokes frequency of this structure. The possibility to effectively combine uniform structure and photonic crystal has been demonstrated.

Keywords: *photonic crystal, stimulated Raman scattering, Raman amplifier, metal-dielectric structure.*

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ESTIMATION OF THE INTERFACE ENERGY OF TRANSITIONAL METALS IN CASE OF ELASTIC DEFORMATION

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The electron-statistical method by Frenkel – Gambos – Zadumkin has been modified to qualitative determine the interface energy of transitional metals on the interface with vacuum. Interface energy was calculated including all kinds of electron, ionic and electron-ionic interactions and temperature contribution, which caused by changing the Fermi energy. Value of deformation has been set individual for each metal. Dependence of interface energy on elastic deformation has been considered for three basic faces of cubic structure.

Keywords: *interface energy, elastic deformation, transitional metals, electron-statistical theory, rhodium, palladium.*

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NEW TYPES OF GEOMAGNETIC DISTURBANCES

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First found new types geomagnetic perturbations on satellite and ground-based observations. A substantial difference between this new types of perturbation of the currently accepted views on this issue. Attempt to assess the possible origin of this new type of perturbation. It is presented a brief overview of the existing species of the geomagnetic disturbances.

Keywords: *geomagnetic disturbance, storms, satellites, shock wave, sudden onset.*

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DYNAMIC ANALYSIS OF THE EARTH POLE OSCILLATORY PROCESS IN A SHORT TIME INTERVAL

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In this article, a celestial model of the Earth pole oscillatory process based on the special variant of problem «Deformable Earth – Moon» in the field of the attracting center (Sun) is considered. In this model main disturbances of large amplitudes and more complicated small-scale properties of motion due to short-period Moon perturbations with the combinative frequencies, supported by the observation of the International Earth Rotation Service (IERS) are considered. On the basis of IERS astrometry data, the numerical modeling of the Earth pole fluctuations − selection of support functions and estimation of unknown model parameters at different time intervals is accomplished.

Keywords*: Earth pole, forecast, lunisolar disturbances.*

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