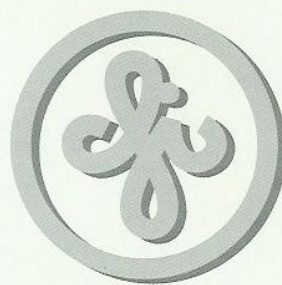
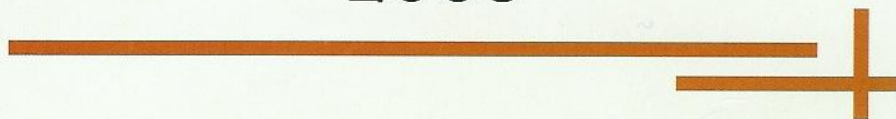


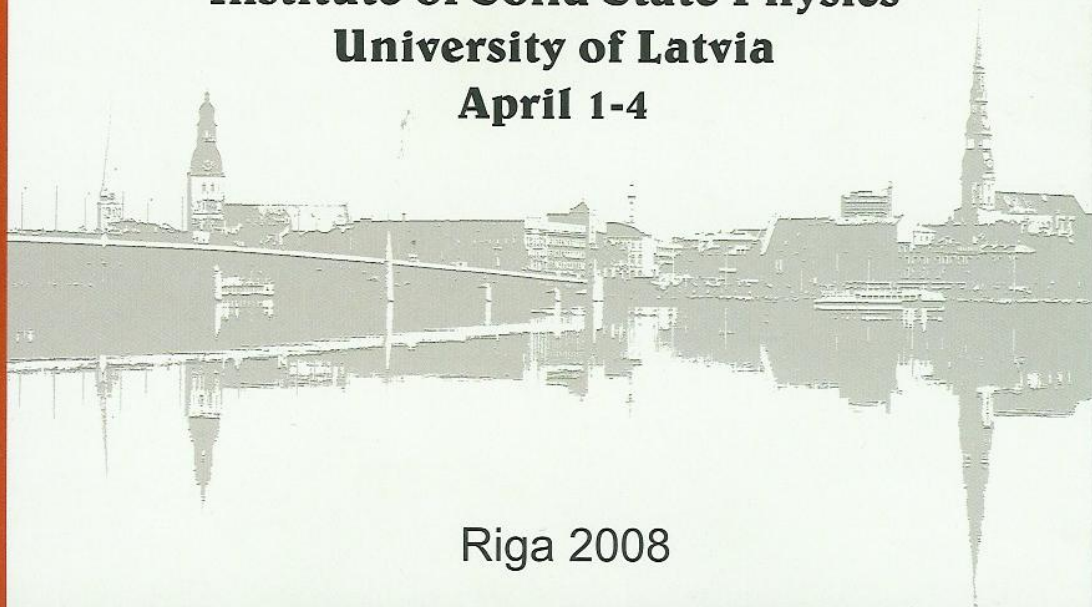
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OPTICAL PROPERTIES OF NANOSTRUCTURES ON A SURFACE OF CdZnTe TERNARY COMPOUND BY LASER RADIATION

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The investigation of interaction of laser radiation with ternary semiconductors CdZnTe crystal is perspective direction in semiconductor physics and in microelectronic technology. In this presentation we have shown possibility of formation of graded band-gap structure in ternary semiconductor compounds by laser radiation.

The change of optical properties and surface morphology of near-surface layer of Cd_{0.9}Zn_{0.1}Te crystal by laser radiation with aim to create graded band-gap was investigated. Nd:YAG laser working in Q-modulation mode with parameters $\lambda=0.532 \mu\text{m}$; $\tau=10 \text{ ns}$; $I=7.0\text{-}20.0 \text{ MW/cm}^2$ was used as radiation source. The methods of photoluminescence and atomic force microscope were used in the experiments. On the surface of the semiconductor crystal the nanometers structure was formed after laser irradiation with intensity of $I \approx 9 \text{ MW/cm}^2$. As the result the A₀X line starts to shift in the direction of high energy "blue shift". The shift of A₀X line is $\Delta E=7.7 \text{ meV}$ at laser intensity of $I=20 \text{ MW/cm}^2$. The moving of exciton line A₀X is explained by exciton quantum confinement effect into nanostructure formed on semiconductor surface. The graded band-gap structure with optical window is formed on nanohills tops. AFM study showed that the change of surface morphology does not take place after laser irradiation by intensity of less than 9 MW/cm^2 . Earlier [1] the opposite result was found. The shift of A₀X exciton band toward the low photon energy - "red shift" in crystal of Cd_{1-x}Zn_xTe ($x=0,06$) after laser irradiation at $I=0.2\text{-}2.0 \text{ MW/cm}^2$ was observed. The graded band-gap structure with insulating burred layer was formed as a result of influence of temperature gradient on redistribution of Cd and Zn atoms. The same effect has been found after irradiation of crystal in accumulation regime ("pulse by pulse" in the same spot).

Reference:

[1]. A. Medvid, L. Fedorenko, B. Korbutjak, S. Kryluk, M. Yusupov, A. Mychko, *Radiation Measurements*, 2007, Vol. 42, Issues 4-5, 701-703.