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Laser Electron-gamma-Nuclear Spectroscopy of Diatomic and Multiatomic Molecules ALEXANDER GLUSHKOV, OLGA KHETSELIUS, ANDREY SVINARENKO, Odessa University — An important class of problems connected with modelling the cooperative laser-electron-gamma-nuclear phenomena in diatomic and multiatomic molecules is now of a great interest. It includes a calculation of the probabilities and energies of the mixed gamma-nuclear and optical quantum transitions in molecules, intensities of the complicated gamma-transitions due to the changing of the molecular excited states because of the gamma nuclear transition. We present a consistent, quantum approach to calculation of the probabilities of the different cooperative laser electron-gamma-nuclear processes in molecules (including the set of electron or vibration-rotational satellites of the gamma-nuclear spectrum). The calculation results for electron-gamma-nuclear transition probabilities in the diatomic (the nucleus 127I with E=203keV in molecule of HI) and vibration-nuclear transition probabilities for some three-atomic XY2, five-atomic XY4 molecules are given. In particular, we present the results of calculation for the vibration-nuclear transition probabilities in a case of the emission and absorption spectrum of nucleus 188Os (E=155 keV) in the molecule of OsO4 and nucleus 191Ir (E= 82 keV) in the molecule IrO4.

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