

DERIVATION OF A MODEL HAMILTONIAN
IN THE “SHORT TIME SCALE” LIMIT

*A.S. Sizhuk*¹, *S.M. Yezhov*²

¹Physics Department, Texas A&M University
(College Station, Texas 77843, USA;
e-mail: cannabiss@mail.univ.kiev.ua),

²Taras Shevchenko National University of Kyiv,
Faculty of Physics
(2, Prosp. Academician Glushkov, Kyiv 03022, Ukraine)

S u m m a r y

We investigate the conventional Hamiltonian describing the non-relativistic quantum electrodynamics and the dynamics of the intrinsic states of N two-level atoms (molecules). It is shown that the Hamiltonian, canonically transformed from the conventional one and including only field operators at the initial time moment, does not contain the near fields inversely proportional to the first and second powers of the distance between any pair of atoms (molecules) on the quite short time scale and allows certain collective radiative effects including the radiation trapping, where atoms or molecules act as a whole.