**The quantum optical nano(micro)-scale effects in a gas medium confined between mirrors**

ABSTRACT

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In this work the calculation method of absorption coefficient in the terms of quantum optics, taking into account the quantization of electromagnetic field and the Doppler effect, is presented. It was shown that the local values of the absorption coefficient non-linearly depends on atomic density and initial intensity. The analytically derived results are demonstrated in graphs for the local absorption coefficient as the function of frequency. The relatively strong dependance of absorptance on the path length of optical light beam is caused by the interatomic coupling by the medium of electromagnetic field. The splitting of the absorption line, induced by the Doppler effect in the system placed between mirrors, is demonstrated.