Single-Emitter Laser with External Synchronization

N V Larionov1 and E N Popov1

1Department of Theoretical Physics, Peter the Great St.Petersburg Polytechnic University, 29, Polytechnicheskaja St., St.-Petersburg, Russia. Contact Phone: +78127750530
Contact Email: enp-tion@yandex.ru

We theoretically study the model of a single-emitter laser with a closed scheme of incoherent excitation in the presence of external synchronization. The phase diffusion of the laser makes impossible to follow the quadrature components. In order to suppress this negative factor and lock the laser phase the external electromagnetic field in a coherent state is used. Using the Heisenberg-Langevin approach we investigate the influence of this external synchronization on a single-emitter laser behavior and look for an optimal value of the coherent field power.