



Physics > Optics

# Nonlinear sigma model for optical media with linear absorption or gain

Zhong Yuan Lai, Oleg Zaitsev

(Submitted on 12 Apr 2012)

In the framework of the Keldysh technique, we formulate the nonlinear sigma model for disordered optical media with linear absorption or gain. The effective action for fluctuations of the matrix field about the saddle point acquires an extra term due to the nonconservative nature of the system. We determine the disorder-averaged Green-function correlator, which has a diffusion pole modified by a finite absorption/gain rate. The diffusion coefficient is found to be close to its value for conservative systems in the relevant range of parameters. In the medium with gain, the random-lasing threshold depends on the sample size.

Comments: 9 pages

Subjects: **Optics (physics.optics)**; Disordered Systems and Neural Networks (cond-mat.dis-nn); Mesoscale and Nanoscale Physics (cond-mat.mes-hall)

Cite as: [arXiv:1204.2608v1](https://arxiv.org/abs/1204.2608v1) [physics.optics]

## Submission history

From: Oleg Zaitsev [[view email](#)]

[v1] Thu, 12 Apr 2012 03:22:37 GMT (19kb)

[Which authors of this paper are endorsers?](#)

Link back to: [arXiv](#), [form interface](#), [contact](#).

## Download:

- [PDF](#)
- [PostScript](#)
- [Other formats](#)

Current browse context:

**physics.optics**

[< prev](#) | [next >](#)

[new](#) | [recent](#) | [1204](#)

Change to browse by:

[cond-mat](#)

[cond-mat.dis-nn](#)

[cond-mat.mes-hall](#)

[physics](#)

## References & Citations

- [NASA ADS](#)

Bookmark([what is this?](#))

