

Study of mesoscopic behaviour of light in disordered and gain-loss assisted systems from application point of view

A Thesis submitted by
Sayan Bhattacharjee

in partial fulfillment of the requirements for the award of the degree of
Doctor of Philosophy



॥ त्वं ज्ञानमयो विज्ञानमयोऽसि ॥

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Certificate

This is to certify that the thesis titled *Study of mesoscopic behaviour of light in disordered and gain-loss assisted systems from application point of view*, submitted by *Sayan Bhattacharjee (P17PH005)* to the Indian Institute of Technology Jodhpur for the award of the degree of *Doctor of Philosophy*, is a bonafide record of the research work done by him under my supervision. To the best of my knowledge, the contents of this report, in full or in parts, have not been submitted to any other Institute or University for the award of any degree or diploma.



Dr. Somnath Ghosh
Ph.D. Thesis Supervisor

Declaration

I hereby declare that the work presented in this thesis entitled *Study of mesoscopic behaviour of light in disordered and gain-loss assisted systems from application point of view* submitted to the Indian Institute of Technology Jodhpur in partial fulfillment of the requirements for the award of the degree of Doctor of Philosophy, is a bonafide record of the research work carried out under the supervision of Dr. Somnath Ghosh. The contents of this thesis in full or in parts, have not been submitted to, and will not be submitted by me to, any other Institute or University in India or abroad for the award of any degree or diploma.



Sayan Bhattacharjee
P17PH005

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Sayan Bhattacharjee

Dedicated to my brother

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List of abbreviations

Abbreviation	Full form
<i>MSD</i>	Mean squared displacement
<i>RMS</i>	Root mean square
<i>DL</i>	Dynamic Localization
<i>NNTB</i>	Nearest-neighbor tight-binding
<i>FWHM</i>	Full width at half maximum
<i>TAL</i>	Transverse Anderson localization
<i>PT</i>	Parity-Time
<i>MFP</i>	Mean free path
<i>eMSD</i>	Ensemble averaged mean squared displacement
<i>COM</i>	Center of mass
<i>PDF</i>	Probability density function
<i>AAH</i>	Abry-André-Harper
<i>SSH</i>	Su-Schrieffer-Heeger
<i>PMMA</i>	Polymethyl methacrylate

