Chaos in Fiber Optic Communication Projects

Overview

This paper will discuss the mechanisms behind the chaotic regimes in fibre optics, discuss the insights it has on the stability of a system and information transmission, and discuss ways about harnessing optical chaos to achieve secure communication and advanced uses. Optical chaos communication (OCC) is a promising alternative thanks to advantages in transmission rate and distance, and compatibility with mature fiber-optic communication system. The conclusions of the experiment. Researchers from. Apostolos Argyris, Dimitris Syvridis, Laurent Larger, Valerio Annovazzi-Lodi, Pere Colet, et al. ⟨hal-04808107⟩ HAL is a multi-disciplinary open access. Abstract—Modulation instability, soliton interactions and turbulence-like behaviour are just some examples of the phenom- ena in fibre systems, which lead to unpredictable but structured patterns in energy distribution.

Article Content

Dec 10, 2025

The FOA Reference For Fiber Optics

A fiber optic project begins with a need for communications and ends with an installed fiber optic cable plant and an operating network that fills that

Jan 30, 2026

Fiber Optic Project Management

The fiber optic cable plant project execution phase is centerede on communication th infrastructure installation activities. The installation phase can be subdivided into the pre--installation, installation,

Sep 29, 2025

100-Gbit/s 100-km Physical-Layer Secure Fiber-Optic Communication

Optical chaos communications have been proposed for secure data transmission with the potential of high bit rate and compatibility with existing fiber-optic systems. Semiconductor lasers are excellent

Dec 17, 2025

Optical chaos communication with a dynamical SOA-based fiber ring

Abstract An experimental system used for the optical chaos communication with a semiconductor optical amplifier (SOA) based fiber ring laser as a dynamical light system is presented.

Jul 25, 2025

The FOA Reference For Fiber Optics

Fiber Optic Network Design Jump To: The Communications System Cabling Design Choosing Transmission Equipment Planning The Route Choosing Components

May 08, 2026

High-speed chaos-based secure optical communications

Request PDF | High-speed chaos-based secure optical communications over 130-km multi-core fiber | Chaotic optical communication is of great significance for secure data transmission.

Oct 15, 2025

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This paper will discuss the mechanisms behind the chaotic regimes in fibre optics, discuss the insights it has on the stability of a system and information transmission, and discuss ways about harnessing

Nov 19, 2025

Experimental demonstration on the proactive detection

Optical chaos communication has a physical-layer security advantage but defends passively against a malicious attack. Here, we conduct a proof-of

Jun 20, 2026

56-Gbit/s chaotic optical communications over 100-km fiber

For the first time, to the best of our knowledge, we experimentally demonstrate a high-speed free-space secure optical communication system based on all-optical chaos modulation.

Jun 12, 2026

64-Gbit/s Optical-Domain Encrypted Chaotic Secure Communication

As a physical layer secure transmission scheme, optical chaotic communication has garnered significant attention for its notable advantages in transmission rate and transmission

May 10, 2026

Chaos-based communications successfully tested

Researchers from the EU funded OCCULT project have succeeded in sending data within a chaotic carrier through a commercial fibre-optic network, illustrating the potential of optical

Nov 06, 2025

86-Gb/s Optical Chaos Communication over 100-km Fiber

Optical chaos communication (OCC) is a promising alternative thanks to advantages in transmission rate and distance, and compatibility with mature fiber-optic communication system. The milestone

Nov 27, 2025

Effect of Fiber Dispersion on Broadband Chaos Communications ...

We demonstrate that the dispersion management techniques used in conventional optical fiber networks, such as dispersion-compensating modules/fibers or dispersion shifted fibers, are also

Mar 22, 2026

Chaos-based communications at high bit rates using

Here we demonstrate high-speed long-distance communication based on chaos synchronization over a commercial fibre-optic channel.

Dec 02, 2025

100-Gbit/s 100-km Physical-Layer Secure Fiber-Optic Communication

This work provides a solution to high-speed laser-chaos communication and facilitates the practical application of optical chaos communication in metropolitan area networks.

Nov 04, 2025

Hardware Implementation of Chaos-Secured Optical Communication Systems ...

In the present chapter, the implementation and performance of contemporary chaotic optical communication systems is presented, focusing on the physical layer encryption methods proposed

Nov 19, 2025

MS-2005-07-08022-resub

Chaos-based communications at high bit rates using commercial fiber-optic links Apostolos Argyris1, Dimitris Syvridis1, Laurent Larger2, Valerio Annovazzi-Lodi3, Pere Colet4, Ingo Fischer5, Jordi

Apr 22, 2026

Chaotic optical communications at 56 Gbit/s over 100

In this Letter, we introduce long short-term memory (LSTM) networks to learn a nonlinear dynamics model of an opto-electronic feedback loop, and then apply

Feb 23, 2026

Chaotic secure optical communication based on the ESP-LSTM

This study systematically analyzes the impact of chaos offset on decryption accuracy in optical communication and explicitly defines the performance threshold requirements for

Nov 22, 2025

86-Gb/s Optical Chaos Communication over 100-km Fiber

Then, 86-Gb/s secure communication over 100-km fiber transmission is demonstrated experimentally by chaos masking of 16-ary quadrature amplitude modulation (QAM) signal.

Oct 16, 2025

Experimental Demonstration of LD-Based Bidirectional Fiber-Optic Chaos ...

A fiber-optic chaos communication system for allowing bidirectional message transmission is first constructed and experimentally demonstrated. Using the synchronized chaos

Jul 31, 2025

Chaos-on-a-chip secures data transmission in optical fiber links

Abstract: Security in information exchange plays a central role in the deployment of modern communication systems. Besides algorithms, chaos is exploited as a real-time high-speed data

Dec 18, 2025

Vol 438 17 November 2005 LETTERS

Chaos-based communications at high bit rates using commercial fibre-optic links Apostolos Argyris1, Dimitris Syvridis1, Laurent Larger2, Valerio Annovazzi-Lodi3, Pere Colet4, Ingo Fischer5 ...

Aug 07, 2025

Design and simulation of optical chaotic-based secure

In this paper, for the first time to the best of our knowledge, a secure hybrid free space/fiber optic (FSO/FO) system using optical chaotic is simulated

Dec 24, 2025

Chaos–based communications at high bit rates using commercial fibre ...

In the present communication we report the achievement of chaotic. transmission rates (higher than 1 Gb/s) and low bit error rates (lower than 10-7).

Aug 03, 2025

Optical chaotic signal recovery in turbulent environments

Abstract Optical chaos offers a promising approach to establishing secure communication at high data rates in a shared physical channel, like optical

Aug 16, 2025

Enhancing performance of optical chaotic-based secure fiber-optic ...

This paper demonstrates an enhanced secure fiber-optic communication system based on chaos using Optisystem 7.0 software. A 10 Gb/s externally modulated signal is transmitted over 100

Aug 08, 2025

Chaotic secure optical communication based on the ESP-LSTM

Fiber optic communication networks currently handle the majority of global data traffic . However, the physical layer of optical networks is exposed to various threats, including jamming,

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