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“Bridging nonlinear photonics, solid-state gain, and computational optimization”

Kiyoul Yang 氏
Assistant Professor,
Harvard University

日 時: 2025年11月7日(金) 15:00~16:00

場 所: 理学部1号館3階340号室+ZOOMでの開催(事前登録制)

【Abstract】

We are curious to combine coupling between optical modes—across both spectral and spatial domains—with optically active gain on integrated photonic platforms. Our goal is to translate these processes, traditionally realized in free-space or fiber-based systems, onto integrated photonics. By embedding them within nanophotonic structures whose dimensions approach the optical wavelength, we can rigorously re-examine their behavior in a regime where confinement, dispersion, and material nonlinearities interact in fundamentally new ways.

In this presentation, we will discuss recent progress in integrated solid-state gain and nonlinear photonics, encompassing Ti:sapphire and rare-earth amplifiers, as well as material platforms based on silicon nitride, sapphire, and lithium niobate. Across these efforts, we have demonstrated amplifiers with net gains exceeding 20 dB, lasers operating from the visible edge to the telecommunications band, optical cavities with quality factors beyond 100 million, and Kerr frequency combs that span more than an octave.

We will also highlight advances in the parallel manipulation of electromagnetic waves using chip-scale photonics enabled by computational optimization. In particular, we explore how optimized photonic structures can independently control light in both spatial and spectral domains, bridging linear and nonlinear regimes to unlock new levels of functionality and integration.

使用言語 : 英語 (English)

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申込方法 : Google forms(下記)にて参加の申し込みを行ってください。

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<https://forms.gle/X1KVPQSifKCszAu5>

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