2016 中技社科技研究獎學金

CTCI Science and Technology Research Scholarship

Nonlinear period-one dynamics of optically injected semiconductor lasers for optical signal processing in radio-over-fiber (RoF) links

Yu-Han Hung[1,*] and Sheng-Kwang Hwang[1,2]

[1]Department of Photonics, National Cheng Kung University, Tainan, Taiwan

[2]Advanced Optoelectronic Technology Center, National Cheng Kung University, Tainan, Taiwan

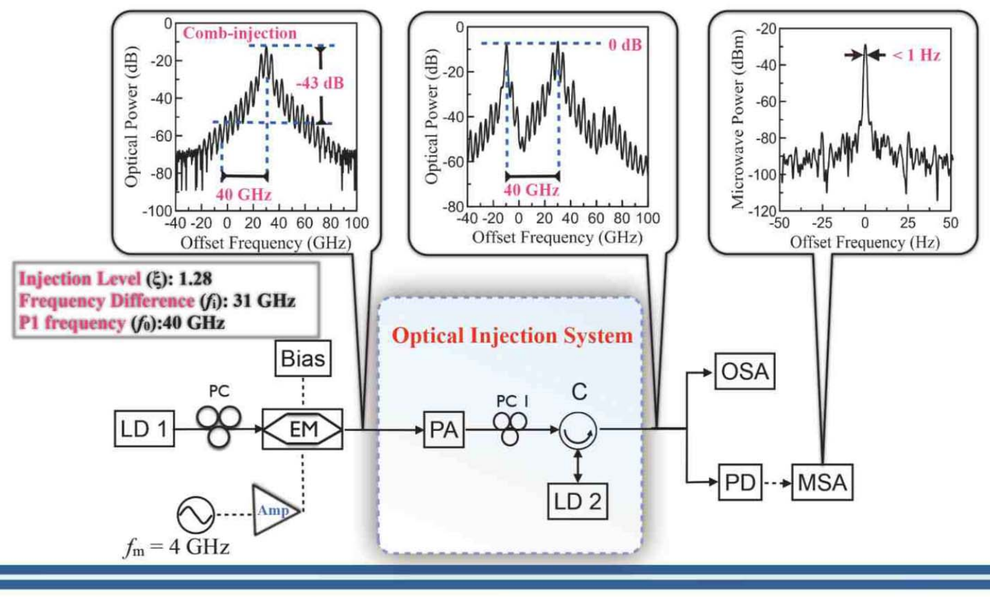
**yhhung@mail.ncku.edu.tw*

研究重點

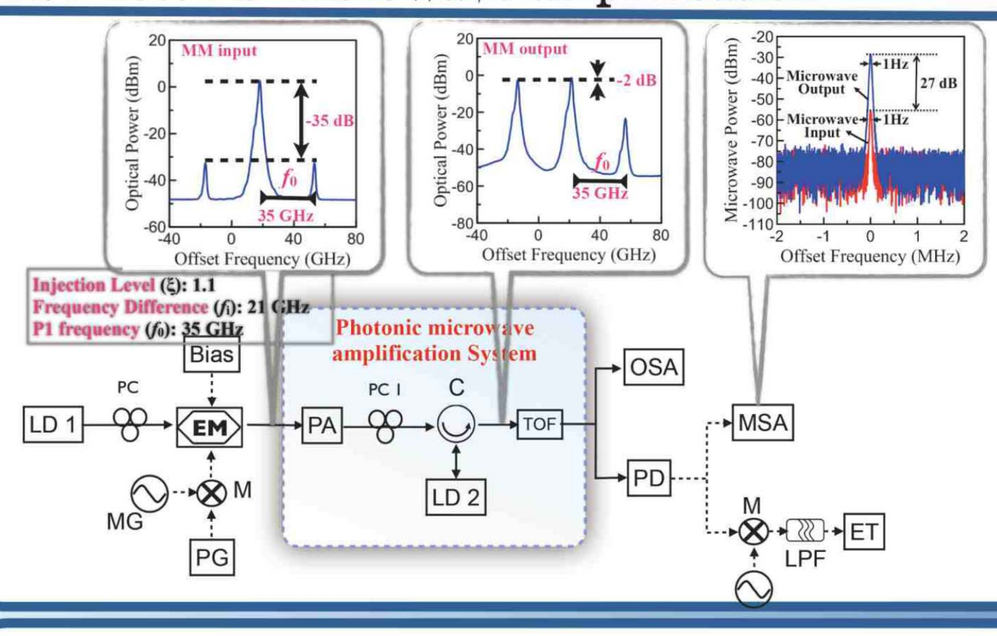
When a semiconductor laser is subject to an optical injection, and is operated in period-one dynamics, the period-one dynamics exhibit one strong resonant sideband lower than regeneration of an injection in frequency, but approximately equal in intensity through anti-guidance effect. The period-one dynamics possess distinct optical features including self-sustained microwave oscillation, deep optical modulation depth and optical single-sideband spectrum. By applying these optical features of period-one dynamics, four different signal processing functionalities are proposed and demonstrated in this dissertation.

研究成果

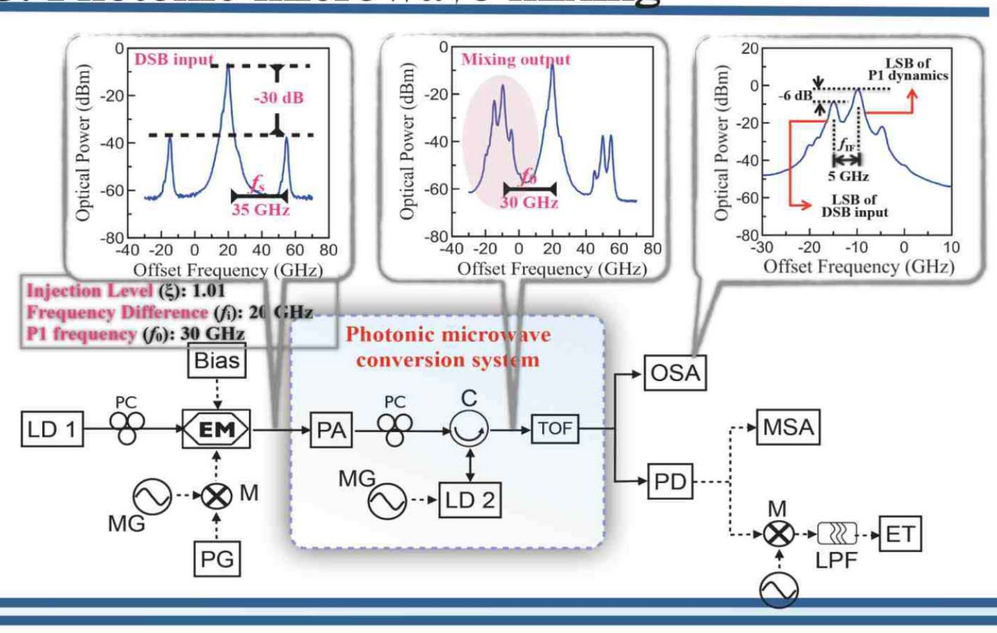
A. High-purity photonic microwave generation



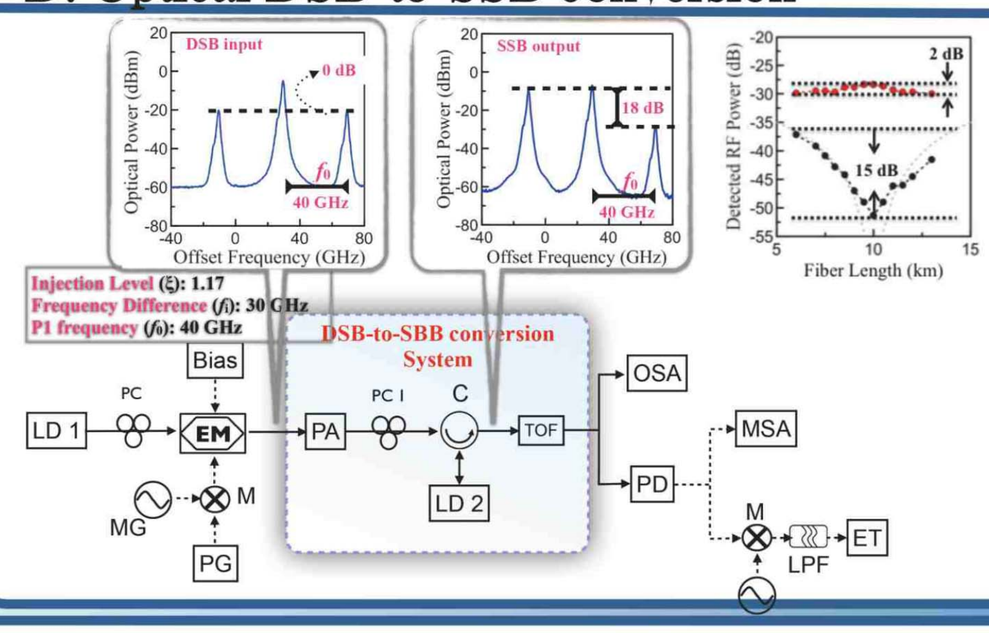
B. Photonic microwave amplification



C. Photonic microwave mixing



D. Optical DSB-to-SSB conversion



研究生活及心得

首先我想感謝我的指導教授，黃勝廣博士，對於我這些年來的耐心指導與啟發；我也要感謝我的實驗室夥伴，他們的陪伴與鼓勵讓我有向前的動力；我也要感謝我的家人，他們的支持讓我永無後顧之憂；特別要感謝中技社長期以來對於科技創新，公益永續的堅持，以及對於科技人才的培育與支持。我希望不久的將來，我也能夠回饋大眾，回饋社會。