“Isolator-free 75 GHz Bandwidth Directly Modulated Laser with Extremely Low Chirp”

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Abstract: In this talk, we review the high-speed laser physics including photon-photon resonance effect, detuned-loading effect, and in-cavity FM-AM conversion effect. We compare three cavity designs to maximize those three effects. In those three lasers, extremely low chirp parameter of 0.6 - 1.0 is realized. This enabled isolator-free operation with a reflection tolerance up to 40%. Simultaneously, a modulation bandwidth (BW) of 75 GHz was achieved. Discrete multi-tone (DMT) was used to transmit ~ 320 Gb/s data rate using such high-speed DML. We also discuss gain-switched operation at 50 GHz using high-speed DML.

Bio: Yasuhiro Matsui graduated from Kyoto University, and joined the Oki Electric Research Lab. in 1988. He developed high-speed directly modulated lasers (DML), narrow-linewidth DBR lasers, and Terahertz mode-locked lasers. From 1996 to 2000, he conducted research at the Femtosecond Technology Research Association (FESTA), Japan, where he generated 20 fs tunable Raman-soliton pulse from DML. He received a Ph. D degree from the University of Tokyo in 2000. In 2000, he joined CoreTek/Nortel Networks and studied polarization behavior of a MEMS-tunable VCSEL. In 2002, he co-founded AZNA, and co-invented the chirp-managed directly modulated laser (CML) and thermally-tunable narrow-linewidth lasers in C-band. Through the acquisition of AZNA by Finisar in 2007, and then, II-VI in 2019, he has been developing high-speed Al-BH DFB lasers at 1300nm and tunable DBR lasers for 10G EPON and NGPON2 applications. He has published more than 120 papers and numerous patents in the US and Japan.