Fully (Implemented, Scalable and Parallel) Recurrent Photonic Neural Networks in Multimode Semiconductor Lasers

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Photonic neural networks are a highly promising computational system for AI-inspired future information processing. We have recently demonstrated the first fully implemented, photonic neural network realized in multimode semicondcutor lasers. The numerous laser modes acts as the systems neurons, which carrier diffusion and intra-cavity diffraction creating recurrent connections. I will discuss our recent result, where we push the realtime data-rate of the neural network towards GHz levels and use such systems to address highly relevant photonic-technology applications.