

Speaker Karlsruhe Days of Optics & Photonics 2023



Abstract: Fiber from A to Z with optical access networks

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Optical access networks, more specifically passive optical network (PON) systems are a low-cost and mature technology that is the predominantly used solution in fiber-to-the-x (home, building, curb, ...) deployments today. More than 70 million optical line terminals (OLT) and more than 900 million optical networks units (ONU) have been shipped worldwide in the past ~13 years. All PON systems up to the 10 Gbit/s-capable PON generations have been driven by the objective to increase peak broadband capacity for

the last mile to satisfy the growing demand over the years originating from e.g., triple play, IP TV and OTT video. Beside throughput in recent years also the user experience has gained significant importance and is addressed by applying methods such as “quality of attenuation measurement” that consider beside throughput also the application latency and end-to-end reliability. The interest especially from business users in true symmetrical 10 Gbit/s services is driving the introduction of higher-speed time division multiplexed (TDM)-PON solutions, like the 25 GS-PON or 50G-PON. This recent PON deployment option coincides well with the expected demand for affordable optical transport solutions as part of the 5G radio access network (RAN) densification applying small cells, and disaggregation of RAN functions for centralized or Cloud-RAN realizations. Such fixed-mobile converged architectures also drive new applications in Campus networks, Smart Cities and industrial applications.

In this talk, I will introduce optical access systems, explain functionality of PON and highlight traditional and new use cases for this system across residential, business and mobile applications. Some consideration will be given to critical network services, e.g., for automated driving and for industrial factory environments. These scenarios extend beyond the residential and optical transport for RAN applications,

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thus, desire for more determinism, like enhanced secure and available connectivity, bounded latency, and low jitter. How future PON systems could look like and which applications they might drive will be outlined as well.

Biography:

René Bonk received the Diploma degree in Physics from the Technical University of Braunschweig, Germany, and the Dr.-Ing. (Ph.D.) degree in Electrical Engineering from the Karlsruhe Institute of Technology (KIT), Germany, for work on all-optical signal processing and semiconductor optical amplifiers. In 2012 he joined Alcatel-Lucent, Bell Laboratories, where he focused on next-generation optical metro-access networks. He is currently part of the Fixed Networks Leadership team at Nokia, Bell Laboratories, and coordinates the activities around the “Converged Access System Research”. He also serves as an editor of the 50G-PON (G.9804.3) in ITU-T. Dr. Bonk has authored and co-authored over 140 peer-reviewed journal and conference papers and has numerous patents / patent applications in the field.