

Acronym/Short Name	OTONES		
Proposal Full Name	Optical Access Networking using OFDM Tones		
Project Coordinator	Prof. Dr. Juerg Leuthold	Email	juerg.leuthold@kit.edu
Organisation	Karlsruhe Institute of Technology		
Partners per country	2 x DE, 3 x UK, 2 x IL	Duration (months)	36
<p>Project abstract</p> <p>The objective of the OTONES project is the development and demonstration of a 1Gbps+ per sub-subscriber PON using a novel optical access network and signaling approach with colorless and cost and energy efficient transceivers. The concept is making use of OFDM for the data multiplexing, the multiple access solution, as well as the seeding method in a densely populated DWDM scheme.</p> <p>The proposal leverages scientific and engineering knowledge of coherent OFDM and advanced self-coherent signal processing for long-haul applications. Significant advantages over traditional time-division multiplex (TDM) schemes (GPON and EPON) are anticipated with the opportunities enabled by OFDM signaling. The concept uses a novel spectrally interleaved, three-tier multiplexing technique of 25 GHz DWDM channels carrying OFDM multicarrier signals, which are further spectrally diluted optically in the remote hub, before being processed at the customer premise (or ONU).</p> <p>The pursued scheme employs tailored components such as photonic integrated optical circuits for the front-ends and the second-tier wavelength router, which are addressed in parallel with the advanced digital signal processing algorithms. An ONU will be implemented that comprises a polarization-resolved pair of receivers, while eliminating local oscillator lasers and 90-degree hybrids, thus being considerably more cost and power efficient. Unique ONU receiver signal processing algorithms will be realized in a custom ASIC to be developed under the program. Upstream data modulation is will use a seed from the special structure of the banded OFDM downstream. Measures to mitigate Rayleigh backscattering limitations will be taken.</p> <p>At the end of the project, the consortium expects to have a functioning prototype of the key devices, i.e. the ONU transceiver subsystem integrated on a silicon platform and the fractional wavelength-routing remote node component, together with the OLT function, establishing the anticipated benefits of OFDM /OFDMA in a long-reach capable terabit PON.</p>			