Broadband blind source separation by integrated photonics

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frequencies, modulation formats, and mixing processes. Wh
a wide frequency range, which is unfortunately not uncomm
we introduce an integrated photonic setup for blind source se
to our previous attempt [1], we fully show the capability of pl
residual-mean-square-errors (RMSE).

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Essentially, BSS is a process that retrieves signals from their mixtures. In4( )-121(i).96 329.4 312 o1lsoanor mschch a6 0 0 9 statistically independent (uncorrelated), and the mixing is linear. Also, the dimension of mixtures is no less than that of sources (the number of mixtures ≥ the number of sources). So given the mixing matrix (full ranked), to retain the signal of interests and eliminates the rest ones, BSS means weighting the mixtures with each column of the inverse matrix $^{-1}$. The MRR weightbank happens to be such a signal processing unit on photonic chips that can perform linear weighted addition of the original mixtures. Shown in Fig.1(a), (c), and (d), the MRR weightbank consists of few round-

to the photonics chip with a much-reduced footprint and cable hassle. The full signal path starts from the MZM and ends at the scope, and the maximal support RF frequencies are determined up to 14 GHz by the BPD, providing coverage towards lots of commonly used RF bands. It is also worth noting that most of the signal path is of the light waveguide, meaning very low latency since the processing is undertaken at the speed of light.

Figure 1. (a) Schematic of the BSS system. MZM, Mach-Zehnder modulator. EDFA, Erbium-doped fiber amplifier. MUX, wavelength dependent multiplexer. (b) PCB interposer integrated with a 4-channel current source functioned as for the MRR driver. (c) Microscope image of