

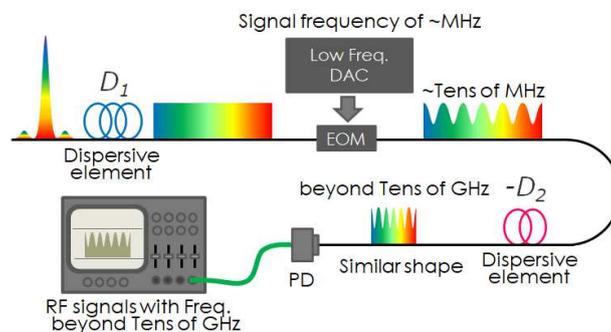


## Photonic-Assisted GHz high frequency signal synthesis taking advantage of MHz low frequency technology

Tsuyoshi Konishi, Yuta KAIHORI, Masayuki MAKINO and Yu YAMASAKI  
Osaka University, Suita, Osaka, , JAPAN, e-mail: konishi@ap.eng.osaka-u.ac.jp

Extreme wideband carriers have a large impact on baseband (BB) processing systems, especially such as digital-to-analog converter (DAC) and analog-to-digital converter (ADC) [1]. While both of photonic approaches in ADC and DAC are evenly indispensable for the future mobile technology, if anything, DAC development would be a pressing issue for recent increasing demand for uplink traffic but the issues on analog resolution, cost, and power consumption become critical as the signal frequency rises beyond GHz. Most of DAC performance can be evaluated as that in an arbitrary waveform generator (AWG) and photonic AWG using spectral-domain and time-domain spectral shapers (SDSS and TDSS) approaches are well-investigated [2-4] to synthesize an ultrafast optical arbitrary waveform. TDSS can serve a function only by using dispersion devices, an electrical to optical (EO) modulator, and electrical AWG. Since, however, all previously demonstrated schemes rely on a GHz class electrical technology, the above inherent issues still remain. To the best of our knowledge, we have firstly proposed photonic-Assisted high frequency signal synthesis taking advantage of low frequency technology [5]. This could remodel it so that it can provide competitive performances in signal frequency as well as analog resolution, cost, and power consumption, while most of approaches have focused on high performance AWG development using state of the art technology.

In this paper, we describe the potential of our proposed approach utilizing out conventional low frequency electrical technology, which can provide overwhelming competitiveness in analog resolution, cost, and power consumption except signal frequency.



**Figure 1.** Proposed configuration for GHz class arbitrary waveform synthesis utilizing out MHz class low frequency technology

**Acknowledgement:** This research was supported by a contract with the National Institute of Information and Communications Technology (NICT).

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