

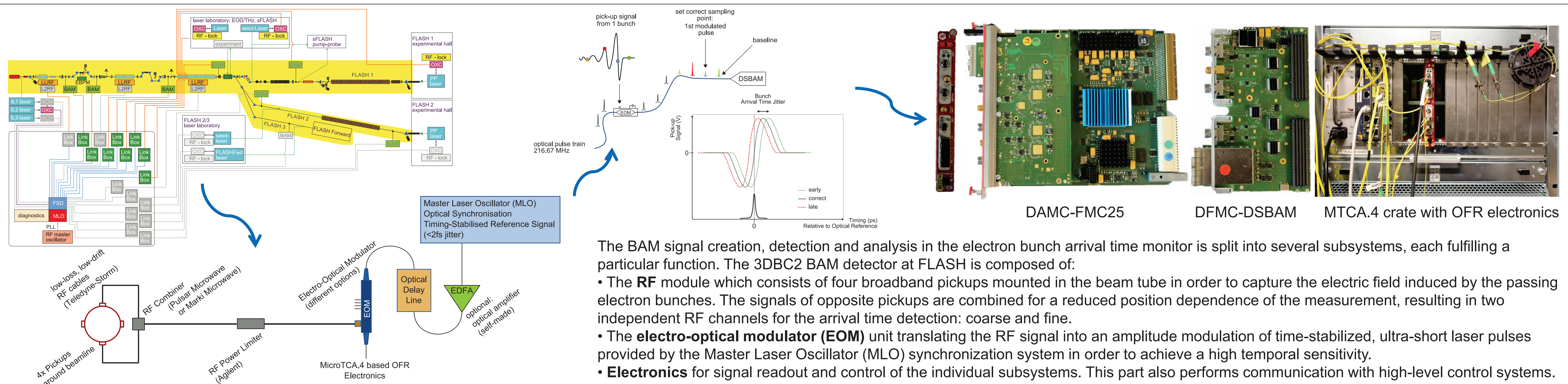
MICROTCA.4 BASED OPTICAL FRONTEND READOUT ELECTRONICS AND ITS APPLICATIONS.



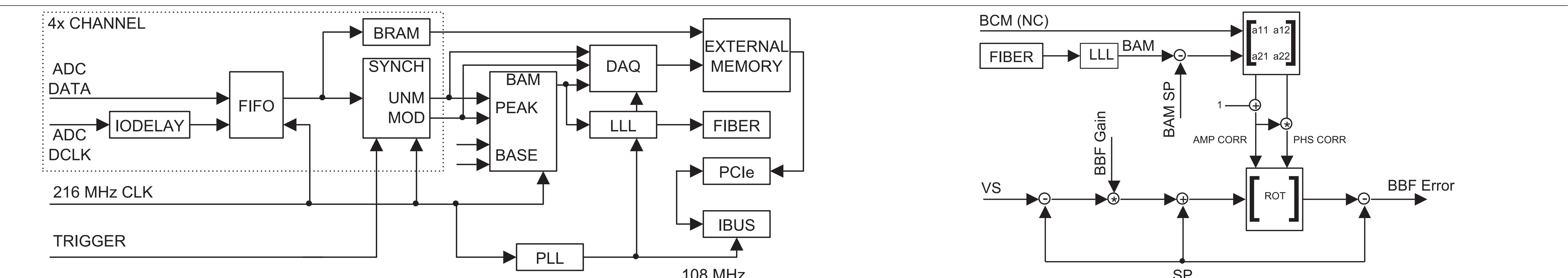
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Abstract In the paper we want to present the MicroTCA.4 based optical frontend readout (OFR) electronics and its applications for beam arrival time monitor (BAM) and fast beam based feedback (BBF). The idea is to have a possibility to monitor the modulation density of the optical laser pulses by the electron bunches and apply this information for the BBF. The OFR composed of double width fast mezzanine card (FMC) and advanced mezzanine card (AMC) based FMC carrier. The FMC module consists of three optical channel inputs (data and clock), two optical channel outputs (beam arrival time), 250 MSPS ADCs, clock generator module (CGM) with integrated 2.8 GHz voltage control oscillator (VCO). The optical signals are detected with 800 MHz InGaAs photodiodes, conditioned using 2 GHz current-feedback amplifiers, filtered by 3.3 GHz differential amplifiers and next direct sampled with 16-bits 900 MHz of analog bandwidth ADCs. The CGM is used to provide clock outputs for the ADCs and for the FMC carrier with additive output jitter of less than 300 fs rms. The BAM application has been implemented using Virtex 5 FPGA and measured with its performance at Free Electron LASer in Hamburg (FLASH) facility.

BEAM ARRIVAL MONITORS AT FLASH



FPGA IMPLEMENTATION



EXPERIMENTAL RESULTS AT FLASH (3DBC2 BAM detector and its BBF operation at ACC1)

