Warsaw University of Technology

DESY

# 600
# First Large-Scale Real-Time Drift Compensation for Low-Level-RF-Stations at the European XFEL

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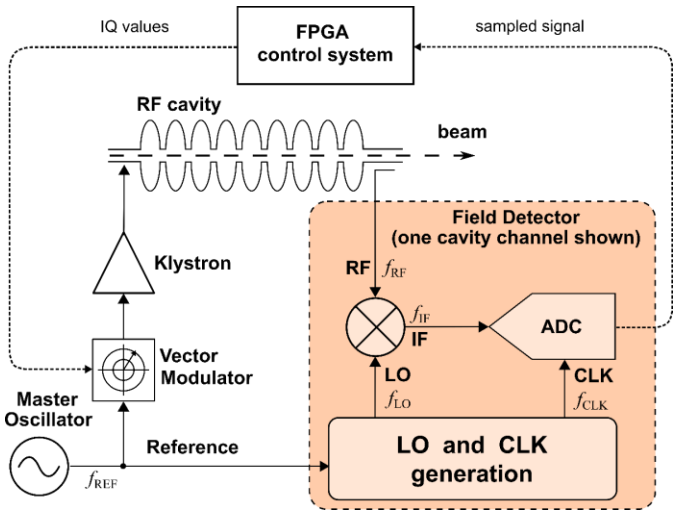
# Introduction

European XFEL requires a high-precision RF cavity field stabilization to achieve reliable operation and sub-10 fs scale of bunch-arrival time variations



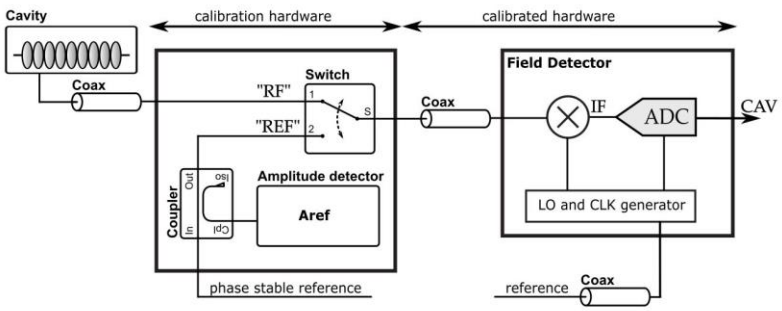

Required field stability for the European XFEL:
$\delta A=0.01\%$
$\Delta\phi=0.01°$

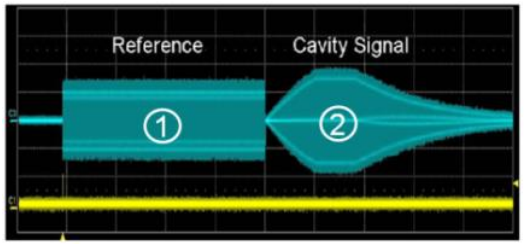
Example drift values of mixer based Field Detectors:
$\delta A=0.2\%/°C$
$\Delta\phi=0.2°/°C$, $\Delta\phi=0.1°/\%RH$

**In this poster we present the concept, design and performance of a Drift Compensation Module implemented in E-XFEL RF Stations**

# Concept, Hardware and Firmware

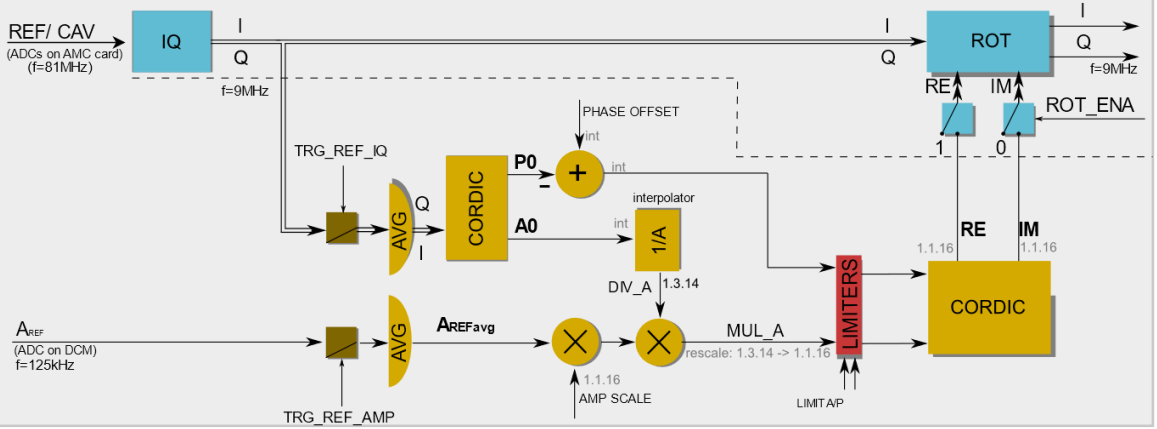
## Reference injection (one cavity channel)




## Temperature controlled, humidity sealed, 16-channel, 19” 2U module

## Firmware integrated with the LLRF control system



# Performance (Phase Drifts)