

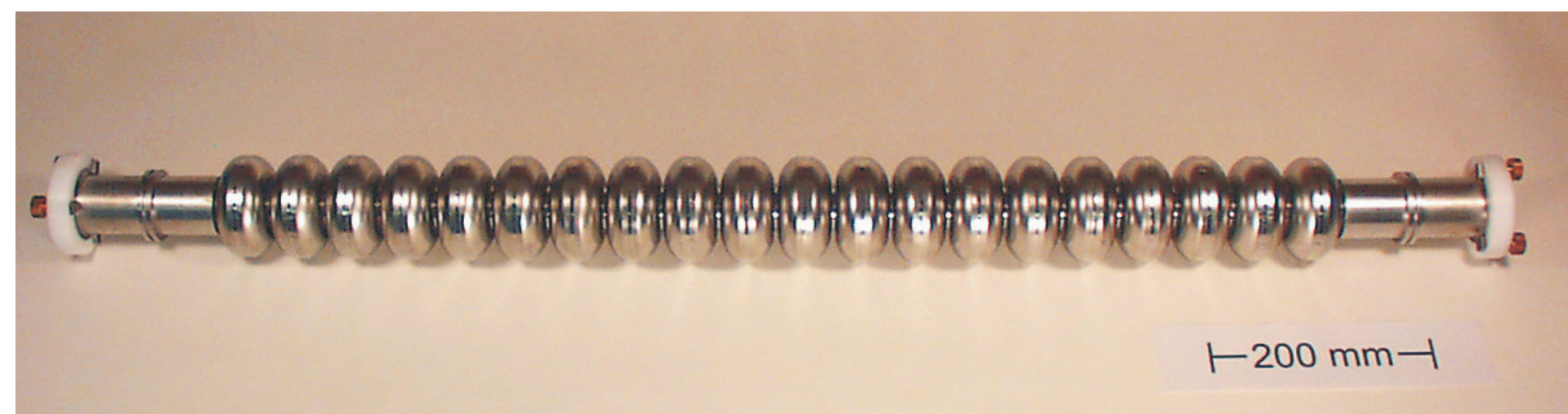
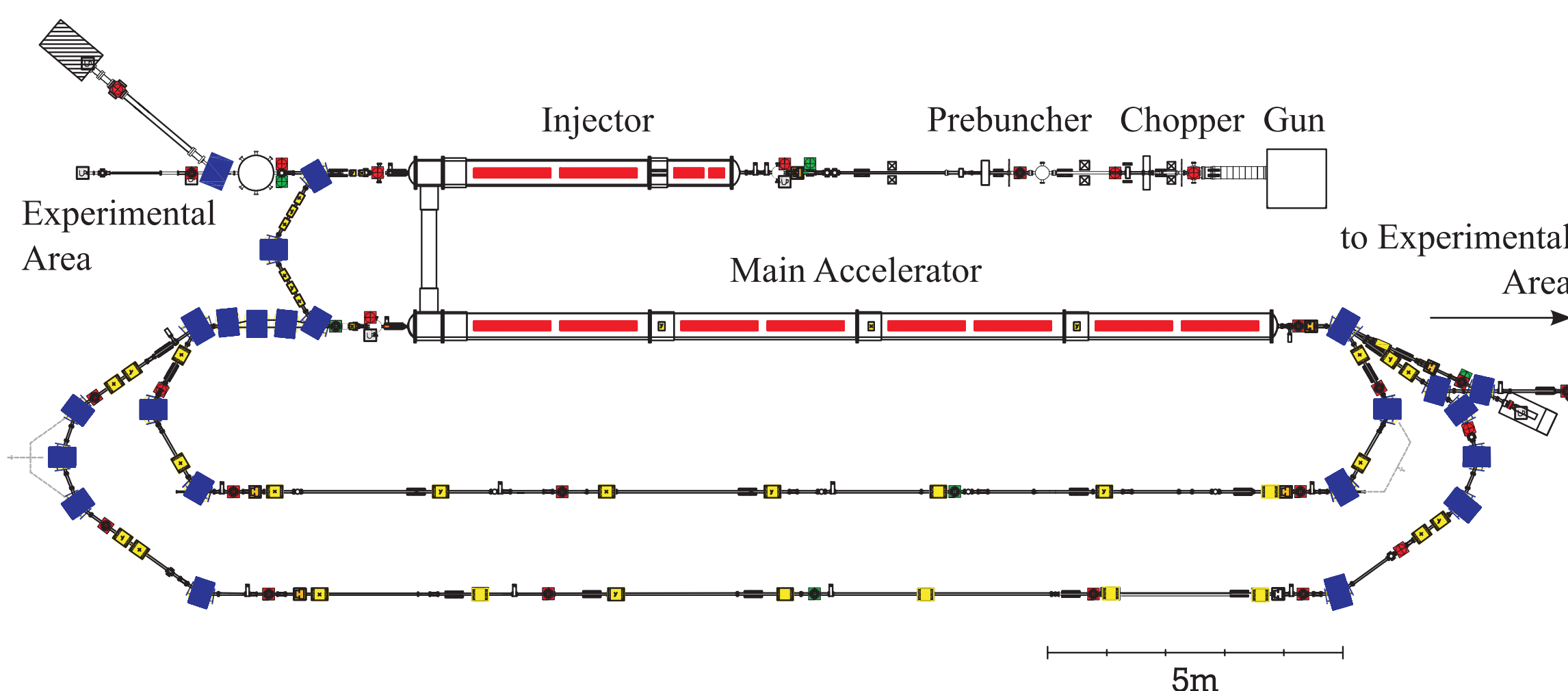
The baseband low level RF control for the S-DALINAC: A flexible solution for other frequencies?*



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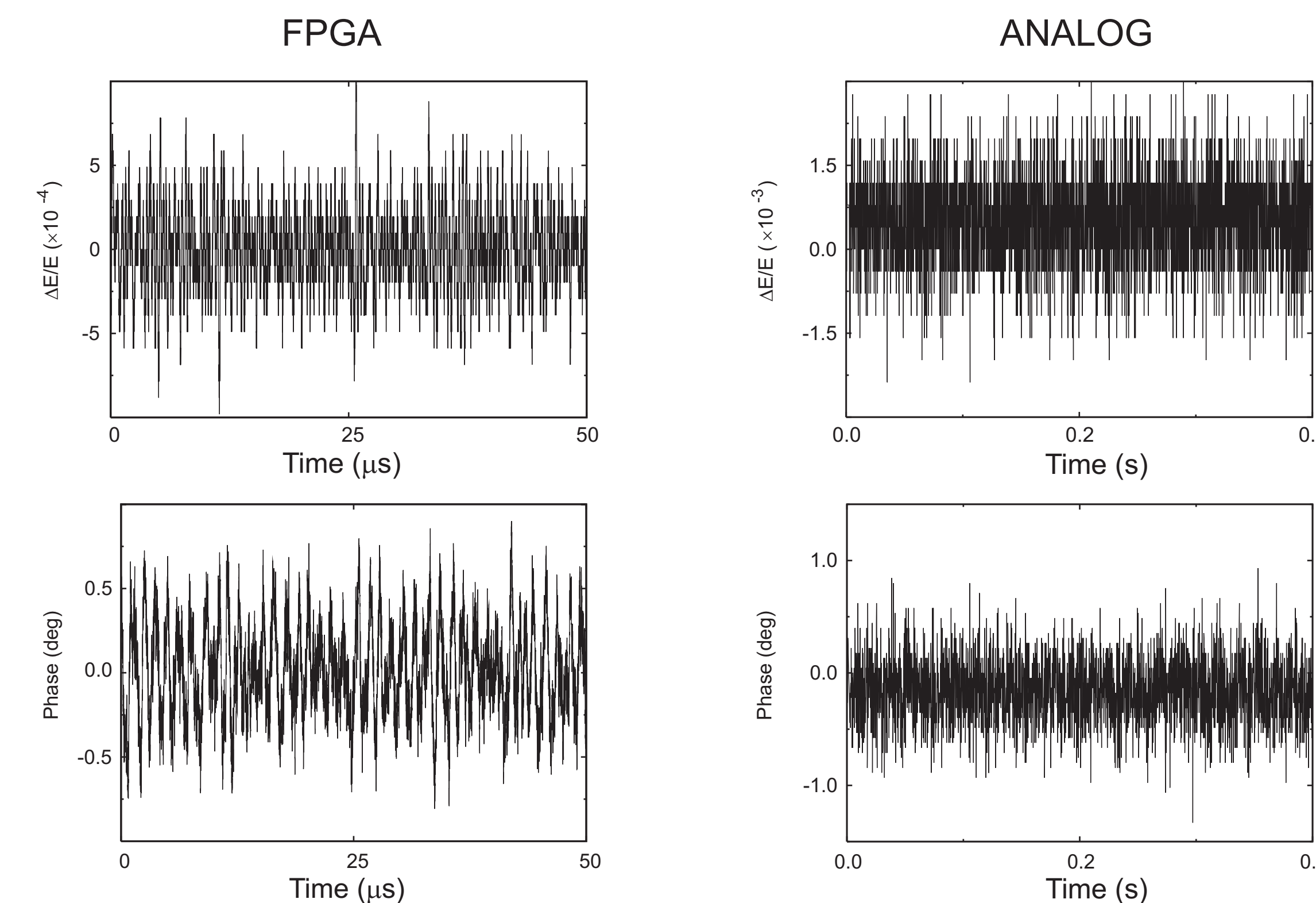
S-DALINAC



Maximum energy: 130 MeV
Maximum beam current: 60 μ A
Operation mode: c.w.

Material: Niobium (RRR=280) Length: 1 m
Frequency: 2.9975 GHz E_{acc} : 5 MV/m
Mode: $TM_{010,\pi}$ Q_0 : $3 \cdot 10^9$
Temperature: 2 K Q_L : $3 \cdot 10^7$

Measurements



	Specification	Analog	FPGA
Relative amplitude stability	$\frac{\Delta E}{E} = 10^{-4}$	$\pm 1 \cdot 10^{-3}$	$\pm 2.5 \cdot 10^{-4}$
Phase stability	$\Delta\phi \leq 0.7^\circ$	$\pm 0.4^\circ$	$\pm 0.3^\circ$

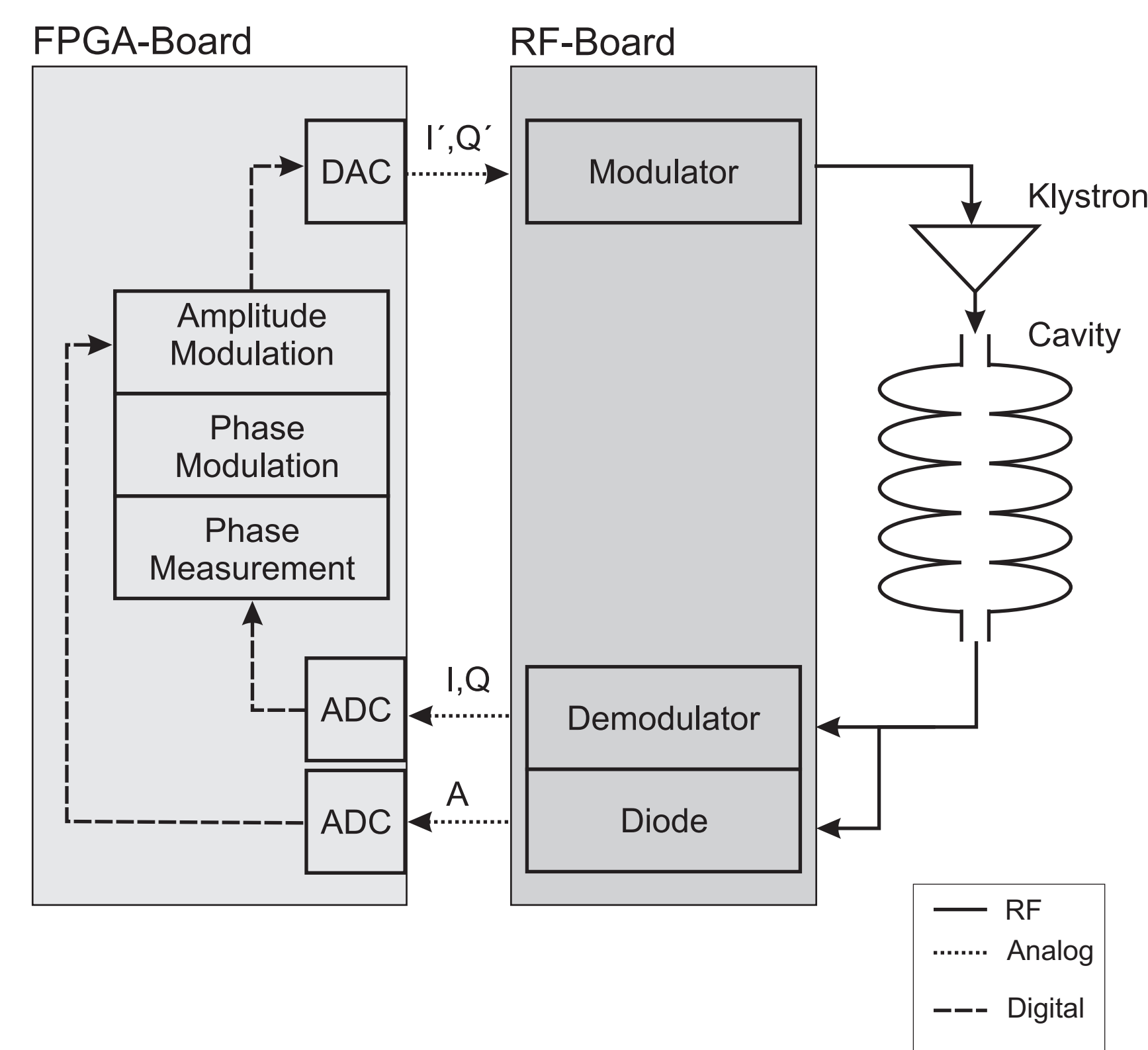
- Equivalent phase accuracy
- Better amplitude stability

Outlook

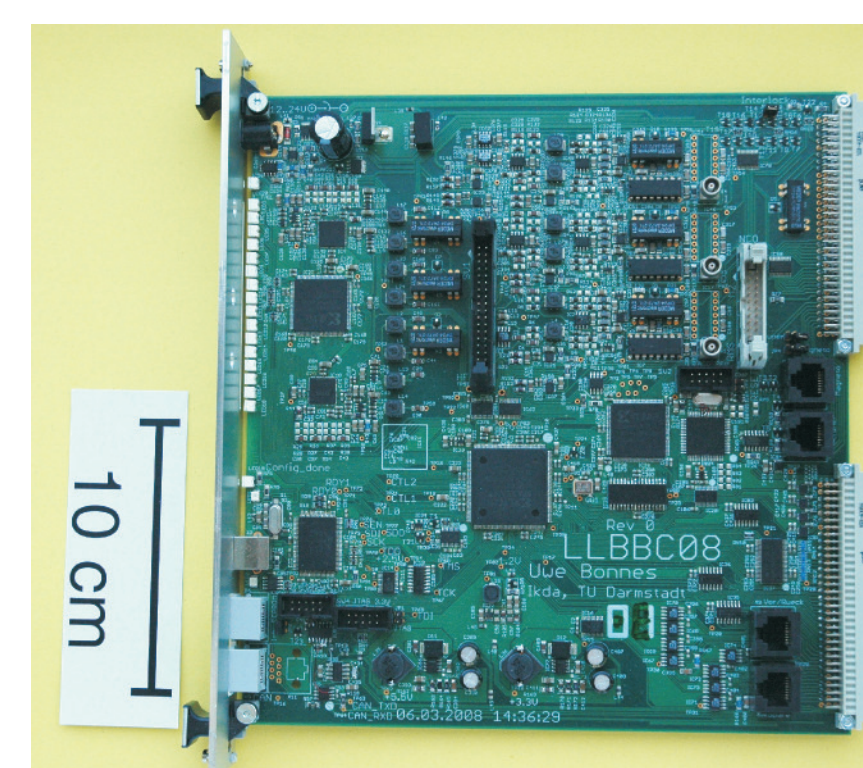
- 6 GHz version is under design
- 324 MHz for the GSI planned
- Algorithm changes for c.w. and p.m.

New RF Control System

Setup

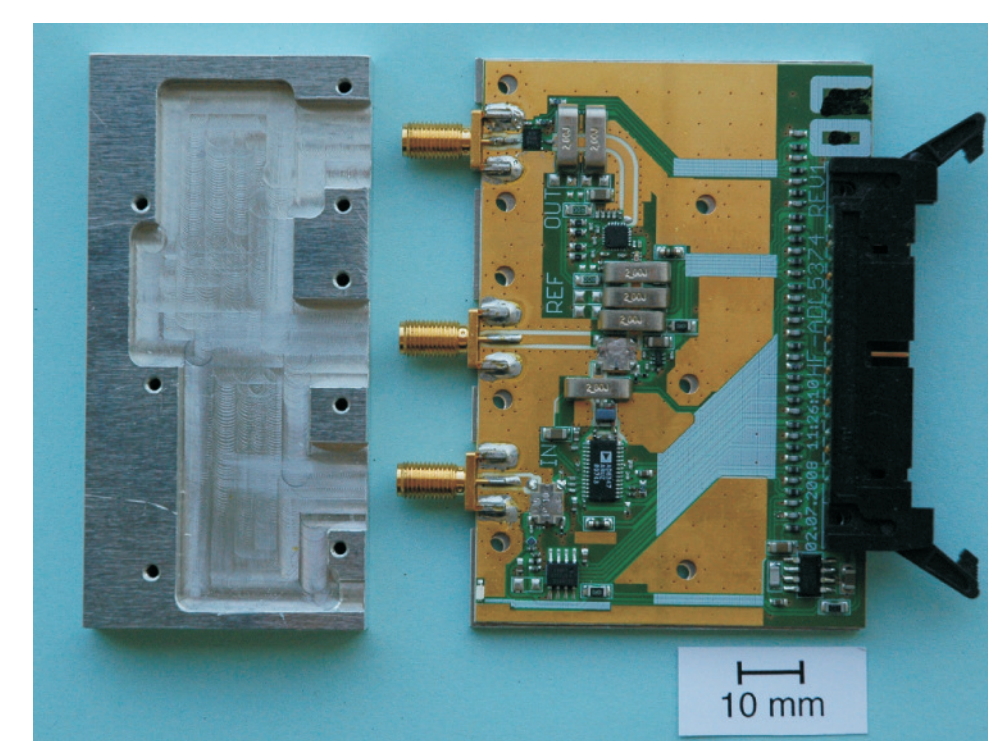


FPGA-BOARD



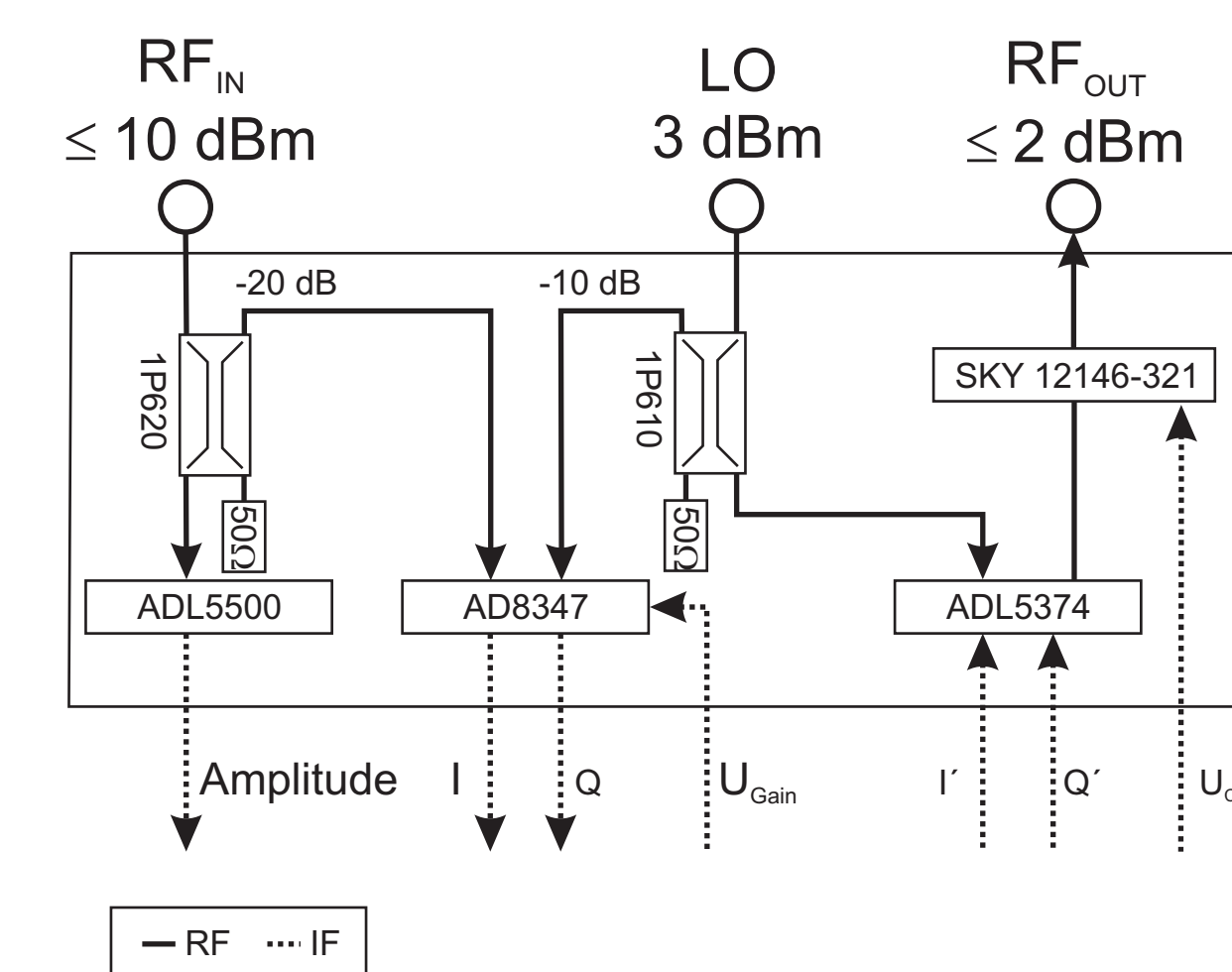
- FPGA based
- USB 2.0 interface
- Scalable system
- Many interfaces
- Base band

RF-BOARD



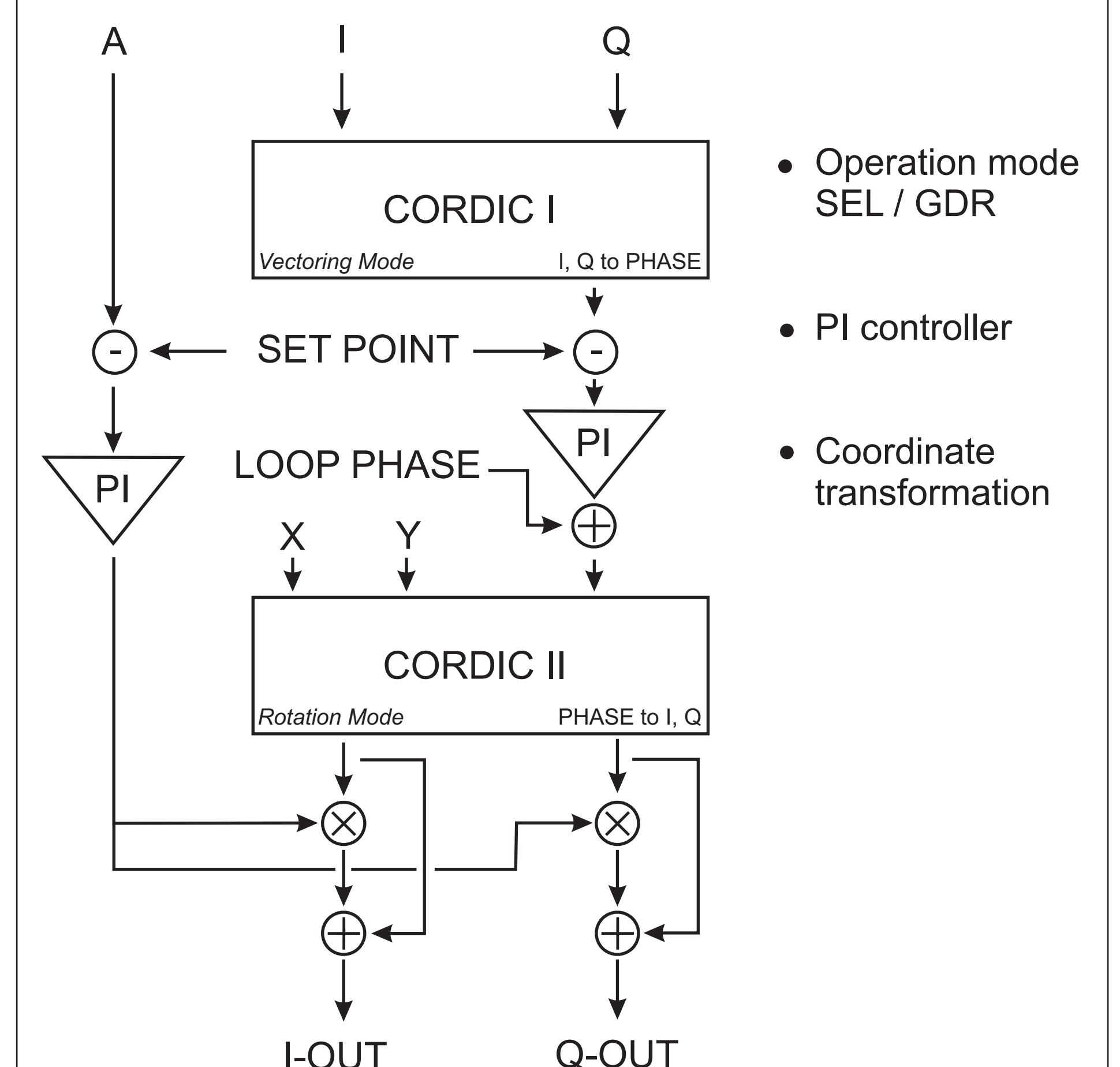
- Low noise
- Small temperature drifts
- Shielded modules
- Signal transmission RF-FPGA-board
- 3 GHz and 1.3 GHz available

RF-Board



- Amplitude detector (ADL5500)
- I/Q demodulator (AD8347)
- I/Q modulator (ADL5374)
- PIN attenuator (SKY 12146-321)

Algorithm



*Work supported by DFG through SFB 634

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