WP3b_a: Electronics

○ Readout for scaling up the systems

  - Multiplexing

  - Custom RFSoc based fast DAQ

  - 4K electronics (cryo-ASIC, cryo-FPGA?)

  - Cryo switches?

○ **Standardization of design** (of readout or devise?)**, packaging, tools, testing facility**
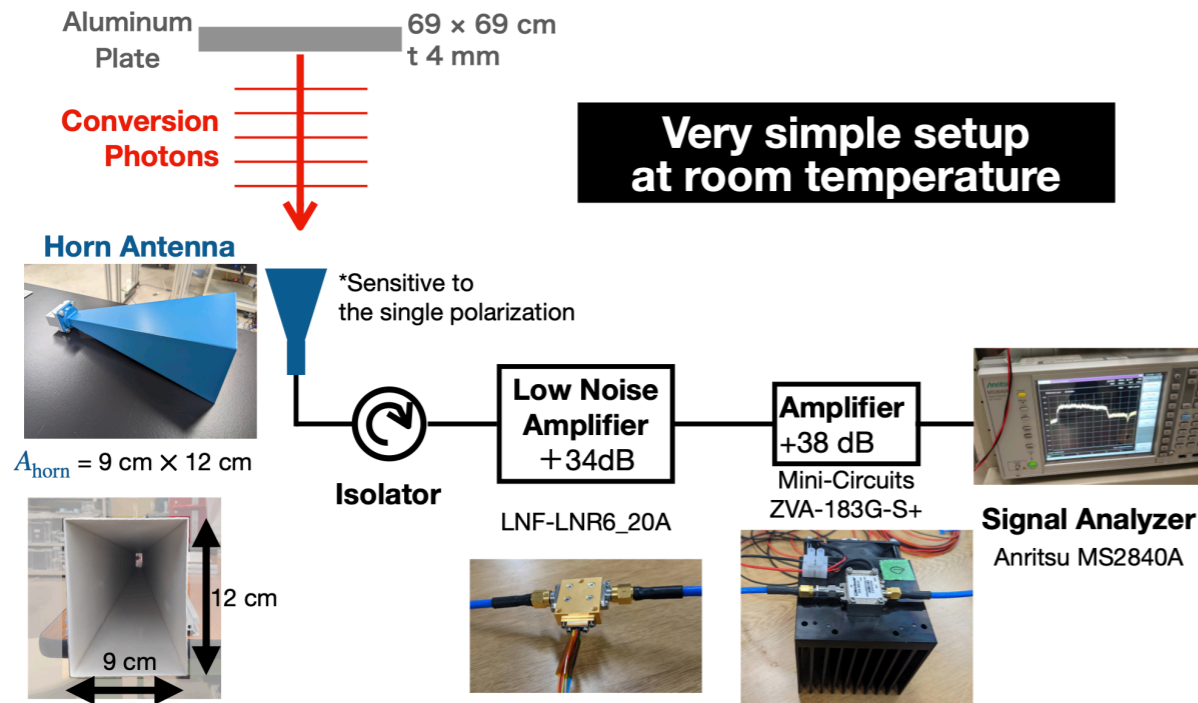
WP3b_b: High energy particle detection

○ Coincidence detectors

○ TES with higher T_c material

○ R&D for achieving the highest energy resolution

  - Metrological calibration lines above 50 keV - 300 keV

  - Understand the bias effect due to BG particles/heat

WP3b_c: Resilient integration of superconducting system

○ Recipe of standard integration?
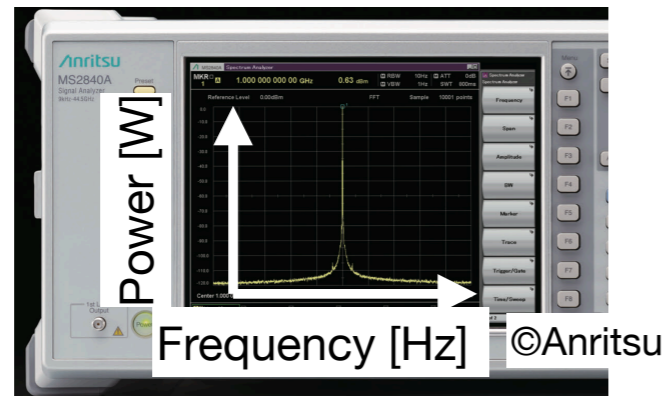
Custom RF-SoC based digitizer

Aluminum Plate — 69 × 69 cm t 4 mm

Conversion Photons

*Sensitive to the single polarization

Horn Antenna

A_{horn} = 9 cm × 12 cm

12 cm

9 cm

18th Patras Workshop, DOSUE-RR

Very simple setup at room temperature

DOSUE-RR experiment (Patras 2023)

Another Activity for Improvement

Isolator

Low Noise Amplifier +34dB

LNF-LNR6_20A

Amplifier +38 dB

Mini-Circuits ZVA-183G-S+

Signal Analyzer

Anritsu MS2840A

Passing through SMA cables

Poster (Hiroki Takeuchi)

"dSpec, dead-time free spectrometer for WISP search using 5G telecommunication technologies"

9

Commercial Signal Analyzer

(Anritsu MS2840A)

Power [W]

Frequency [Hz] ©Anritsu

2 MHz bandwidth

New Spectrometer "dSpec"
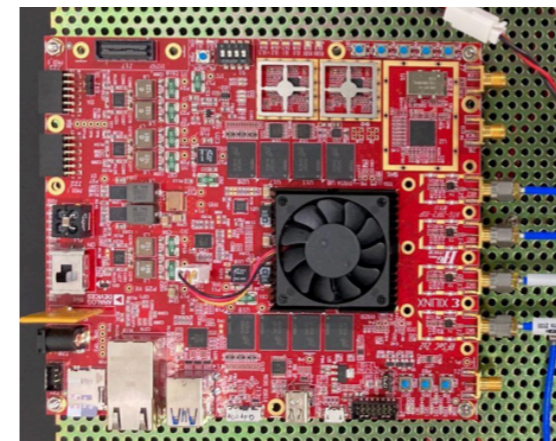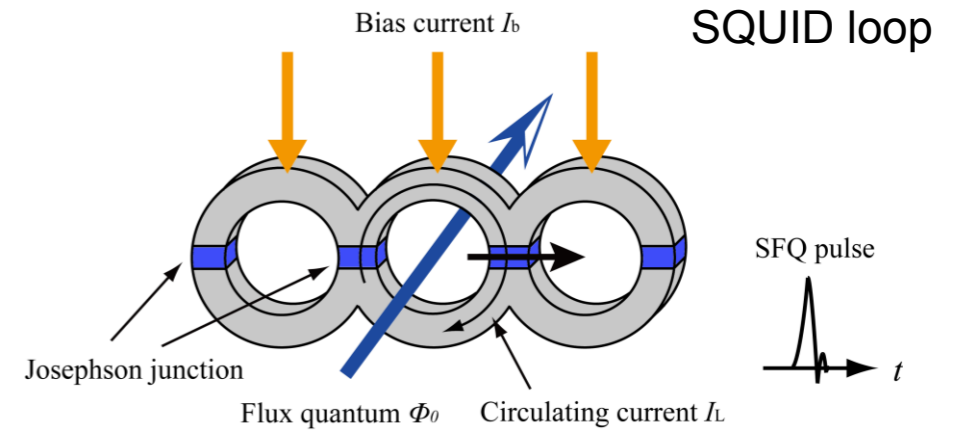
4 GHz bandwidth
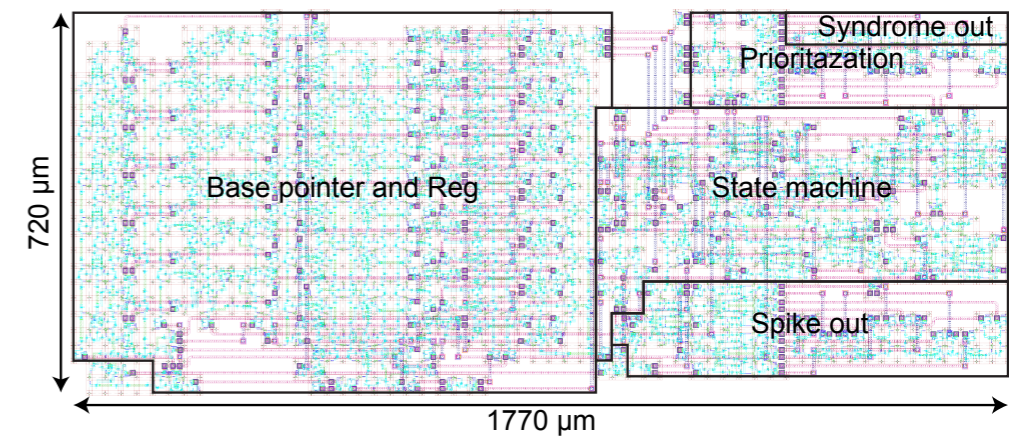
"4K Electronics"

Cryo-CMOS   Pauka et al. (2021)
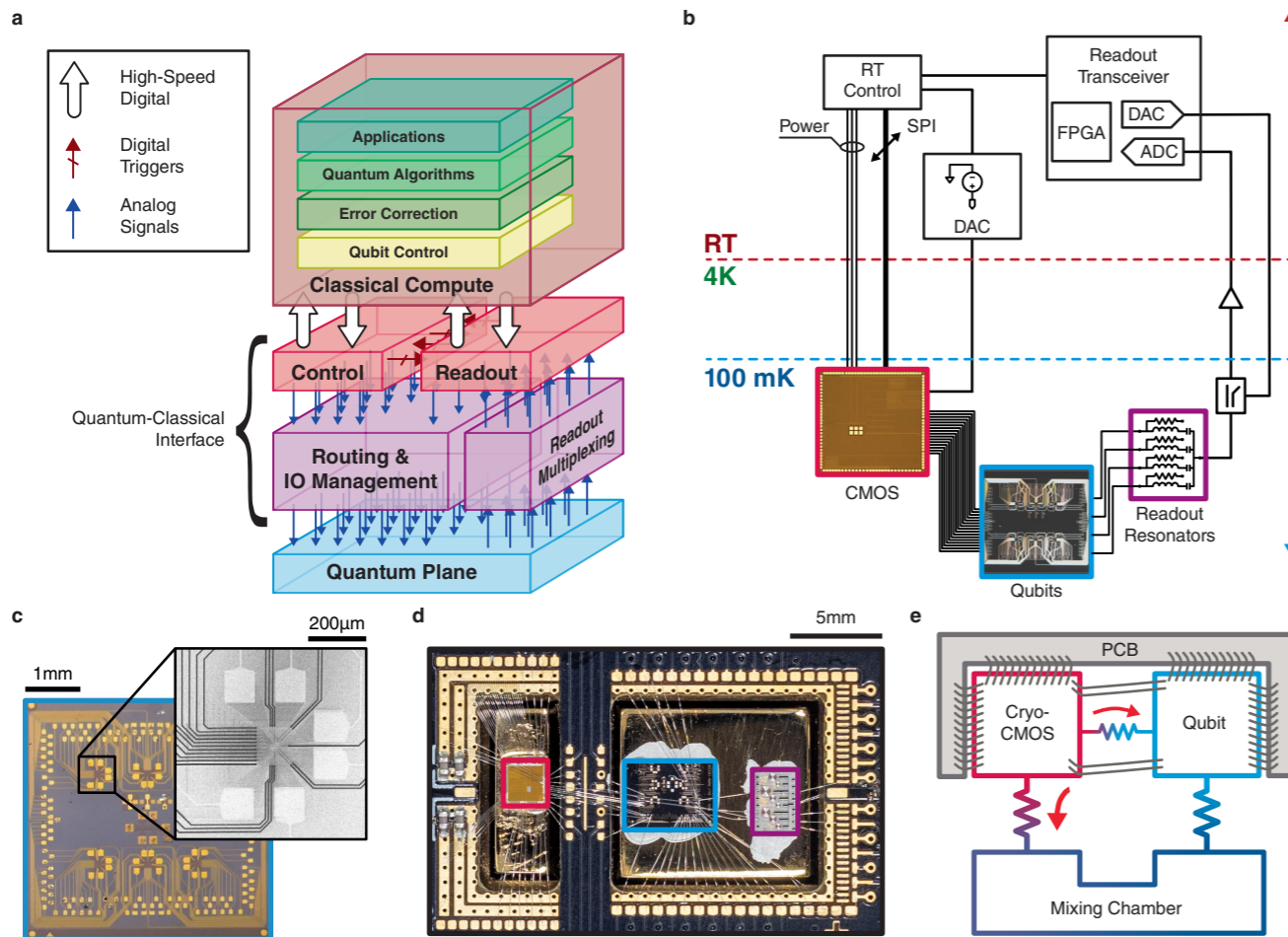
SFQ based QEC decoder

SQUID loop

SFQ = Single Flux Quanta

2.8µW @3000 josephson junction

Ueno et al (2021)