

# Needs for RF source at SACLA and SPring-8

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RF Sources Virtual Roadmap Meeting

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# RF sources at SACLA

## Current usage

- C-band (5.712 GHz), 50 MW klystron: 73
- S-band (2.856 GHz), 50 MW klystron: 5
- L-band (1.428 GHz), 30 MW klystron: 1
- 476 MHz, 110 kW SSA: 2
  - Recently replaced from IOTs
- 238 MHz, 14 kW SSA: 2
- **Klystrons have sufficiently long lifetime.**
  - 21 tubes were replaced in 15 years
  - 60 tubes has been operated > 90,000 hrs

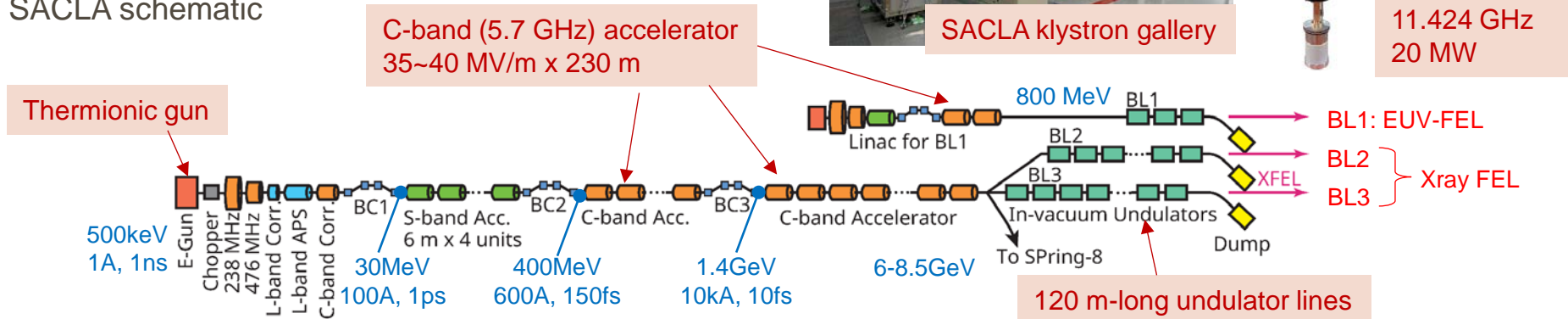
## “SACLA-II” project (targeted in 2036-2040)

- High repetition 60 Hz → 600 Hz, keeping the electrical power consumption
- **Improve power efficiency by 10 times**
  - C-band → X-band (11.424 GHz)
  - Short HV pulse, 5 μs → 500 ns
- Improve klystron’s power efficiency

Needs

- **Required X-band klystron**
  - 20 MW, eff=40% → 50 MW, eff>50% ?
  - Could we collaborate on development?

## SACLA schematic



Canon E37116  
11.424 GHz  
20 MW

# RF sources at SPring-8

## Current SPring-8 RF stations: 4

- 509 MHz, 1.2 MW klystron

## SPring-8-II upgrade (2029~)

- Low emittance < 100 pm\*rad
- 100 mA → 200 mA
- 8 GeV → 6 GeV
- Klystron power will be reduced
  - 700 kW → 500 kW

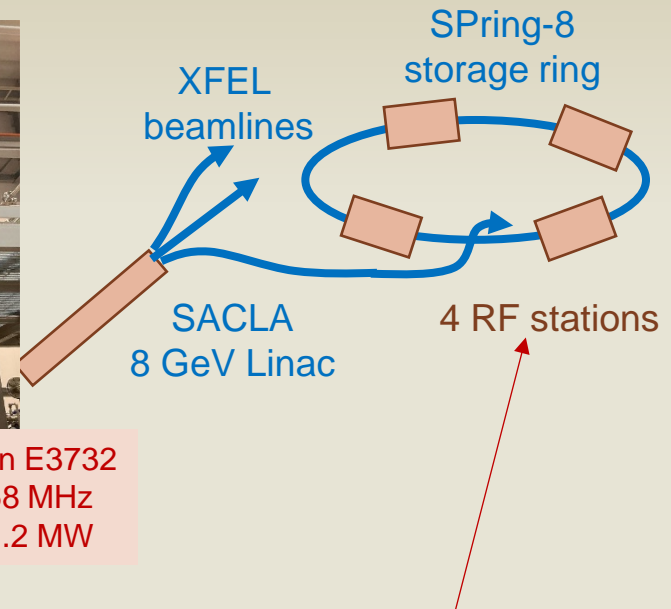
• Plan to replace to SSA in future

## Harmonic cavity plan

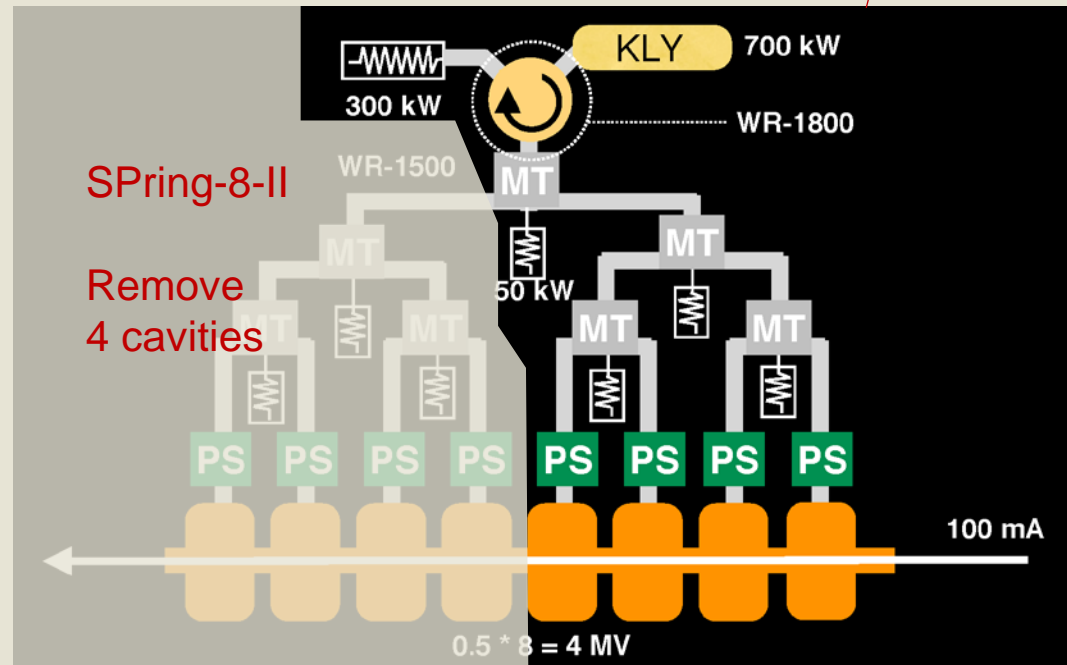
- Extend the bunch length to extend the Touschek life time
- 1.5 GHz, NC cavities x4 stations
- Several 10 kW SSA x4



Canon E3732  
508.58 MHz  
CW 1.2 MW



*Needs*



*Needs*