

# 3rd ARD-ST3 Workshop

## on ps - fs Electron and Photon Beams

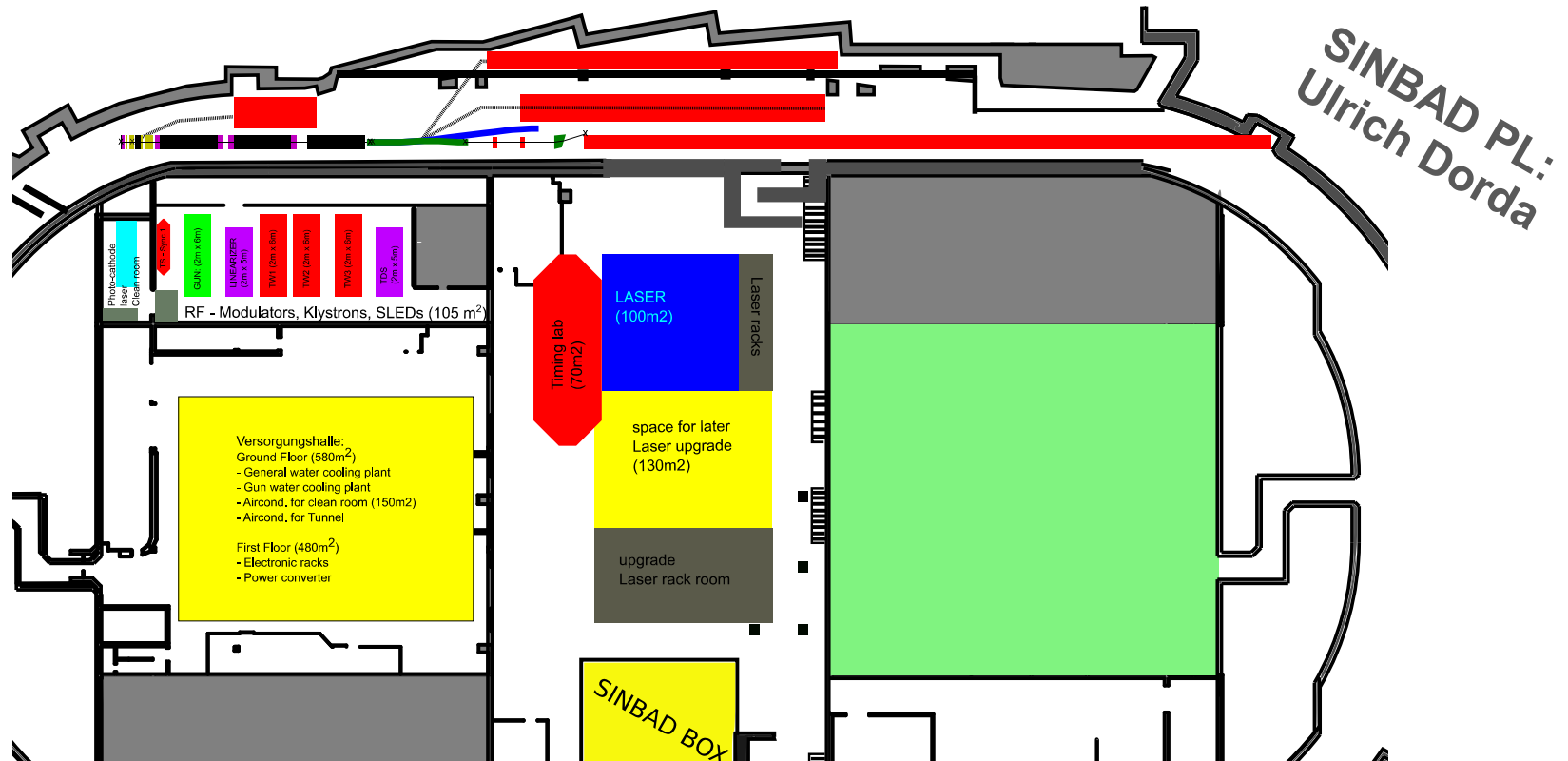
# An Introduction to the SINBAD Linac

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Karlsruhe, Jul. 15, 2015

# SINBAD (Short Innovative Bunches and Accelerators at DESY)

Turning good ideas into useful technologies requires dedicated R&D facility for beam test and prototyping !

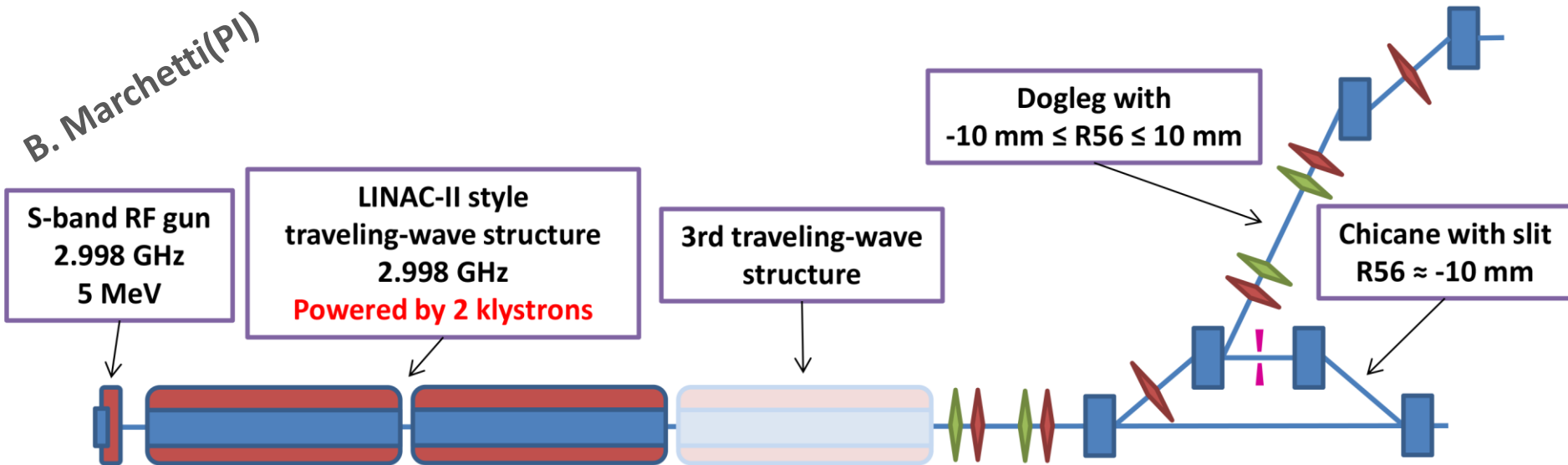


- LWFA with external injection
- FEL by a plasma accelerator
- Laser accelerators on a chip
- Medical imaging



# Layout of SINBAD linac

B. Marchetti (PI)



## 1<sup>st</sup> stage

- Bunch duration: **sub-fs** - a few fs
- Energy ~ **100 MeV**
- Bunch charge: **0.2 - 20 pC** (up to 1 nC)
- Transverse emittance < **0.5 mm·mrad**
- First beam from the gun – 2017
- Linac – 2018

## 2<sup>nd</sup> stage

- Bunch arrival-time jitter  $\leq$  **10 fs**
- Transverse position jitter  $\leq$  **few  $\mu\text{m}$**
- Energy ~ **200 MeV**
- X-band technology (linearizer...)
- Applications
- To big extend relying on ATHENA funding > 2018

# Progress of SINBAD linac

- **Simulation studies of different compression schemes**

- Velocity bunching
- Magnetic compression with slit
- Hybrid compression
- \* Recompress the overcompressed bunch
- \* Two-stage compression

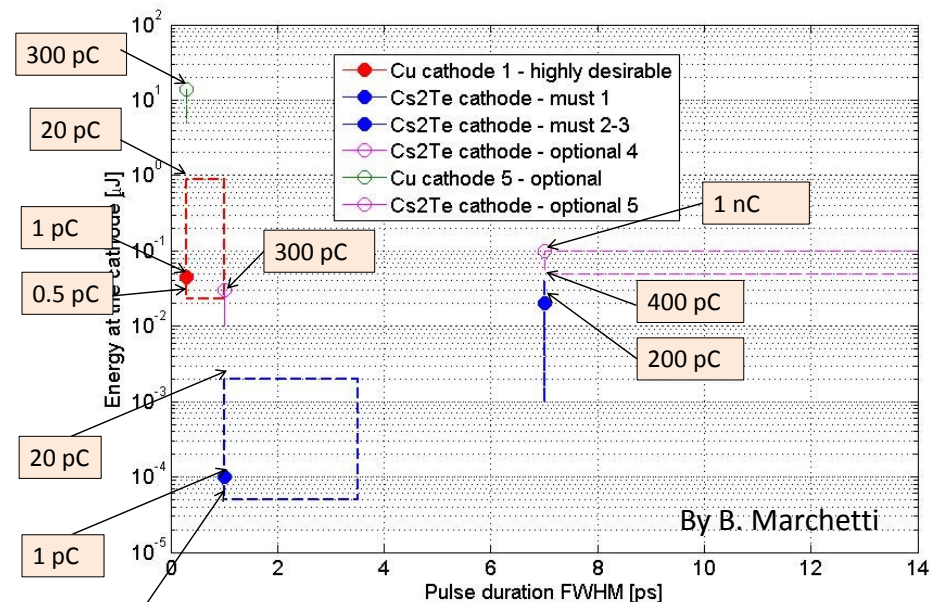
- **Bunch arrival-time jitter studies**

- Forming a tolerance budget by start-to-end simulation
- Jitter compensation

- **Infrastructure**

- **Procurement**

- Gun
- RF-stations
- Photocathode laser



To find a compromise between affordability & flexibility!

