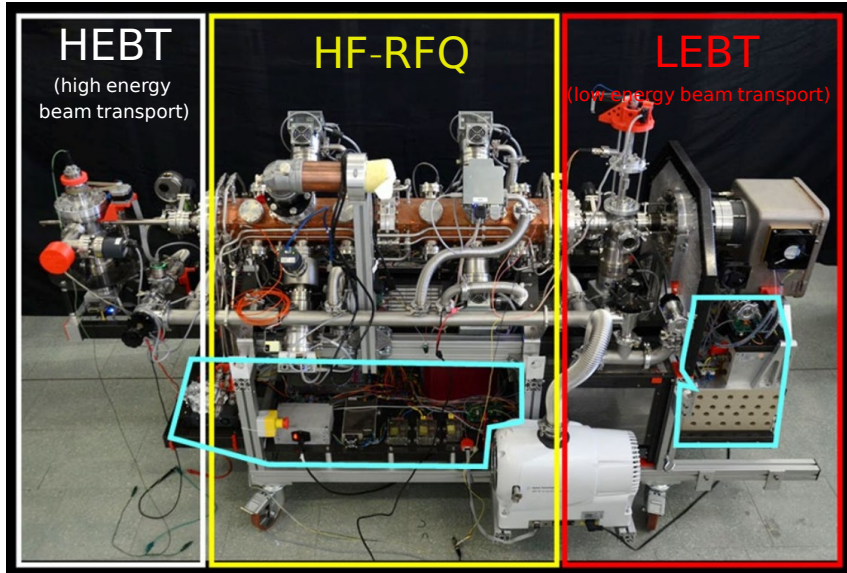


MACHINA control system

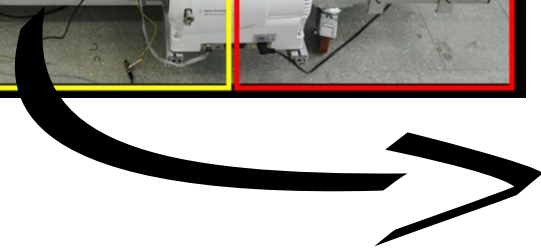
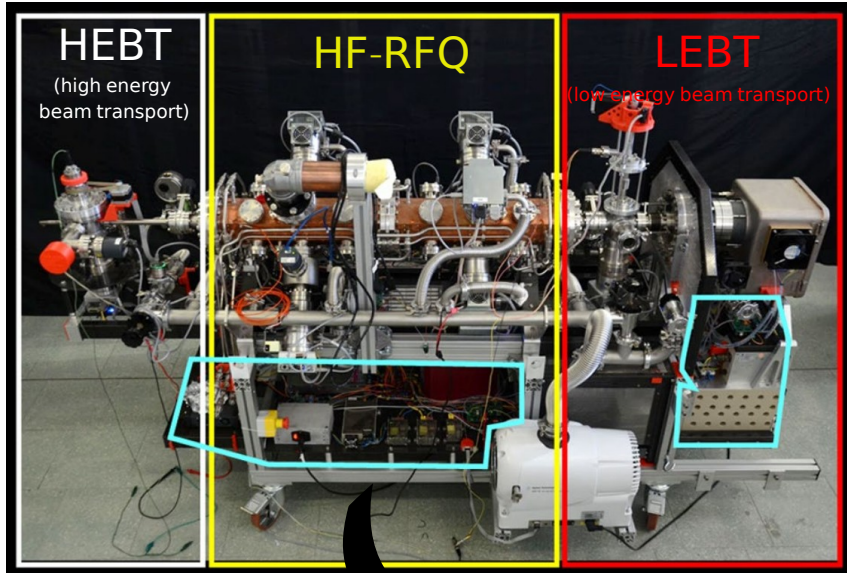


Caroline Czelusniak
on behalf of the MACHINA
collaboration

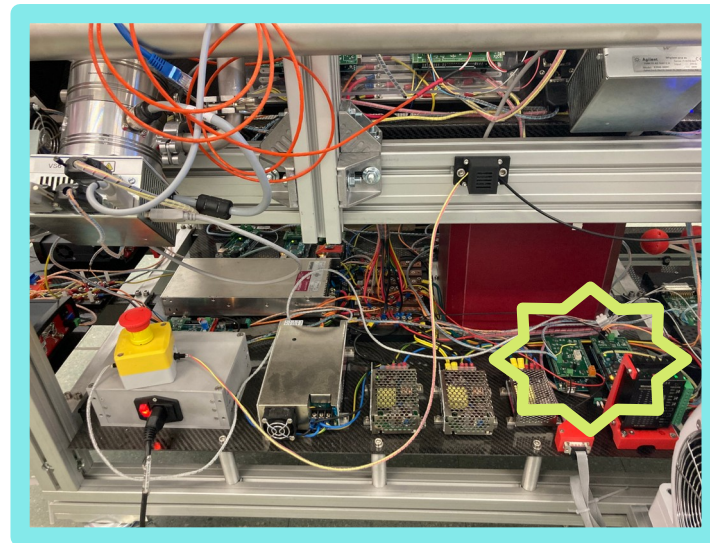
Control system – The meaning



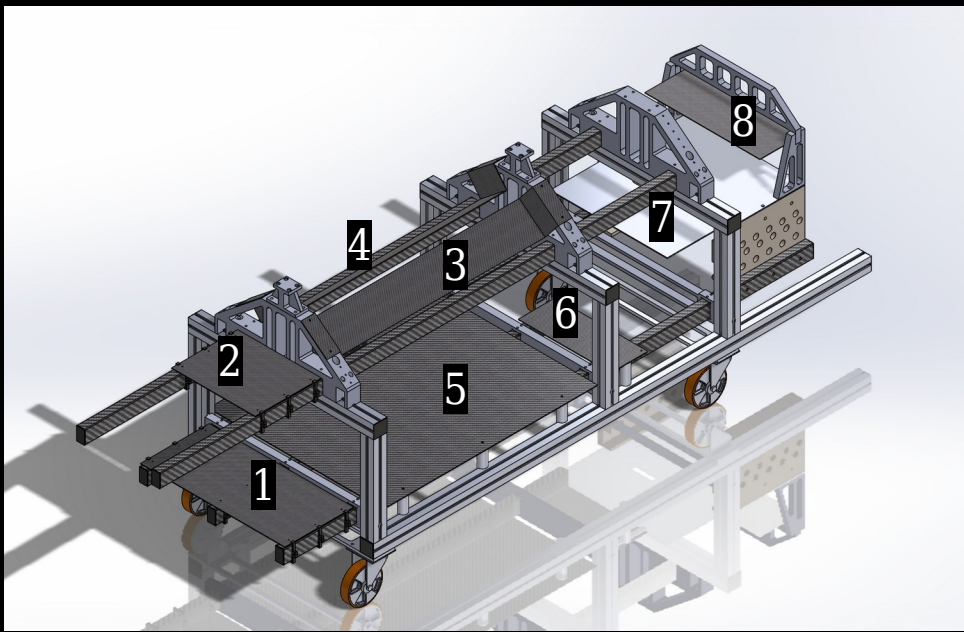
Control system – The meaning



- 20 Arduino boards work as peripherals to:
 - * Set logic states (ON/OFF, OPEN/CLOSE)
 - * Set and read parameters (vacuum pressure, power supplies)



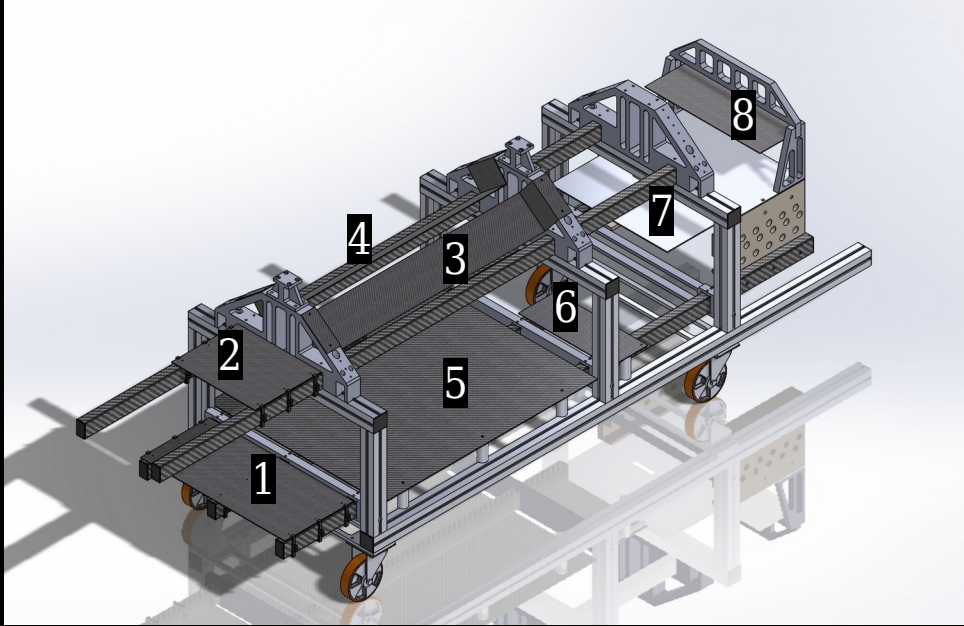
Arduino Positioning



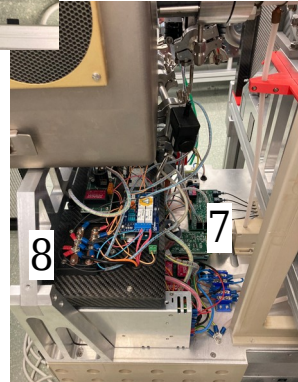
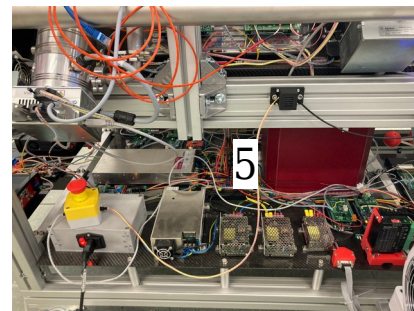
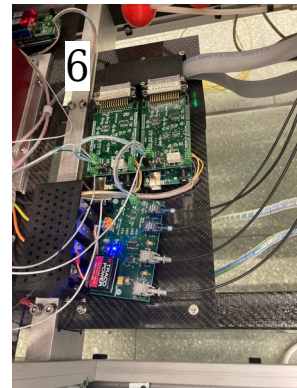
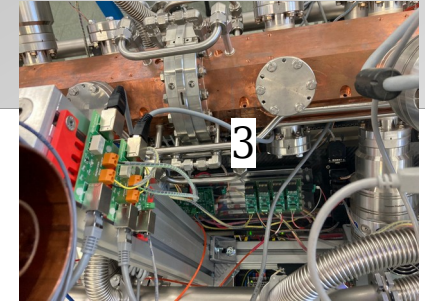
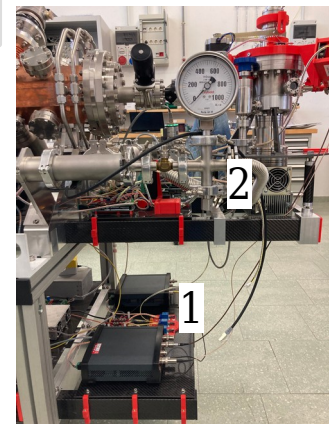
- 1 - Deck-High Energy
- 2 - Deck-High Energy UP
- 3 - Deck-RFQ
- 4 - Deck-RFQ2
- 5 - Main Deck
- 6 - Deck-Optical Link
- 7 - Deck-High Voltage
- 8 - Deck-High Voltage UP

Arduino Positioning

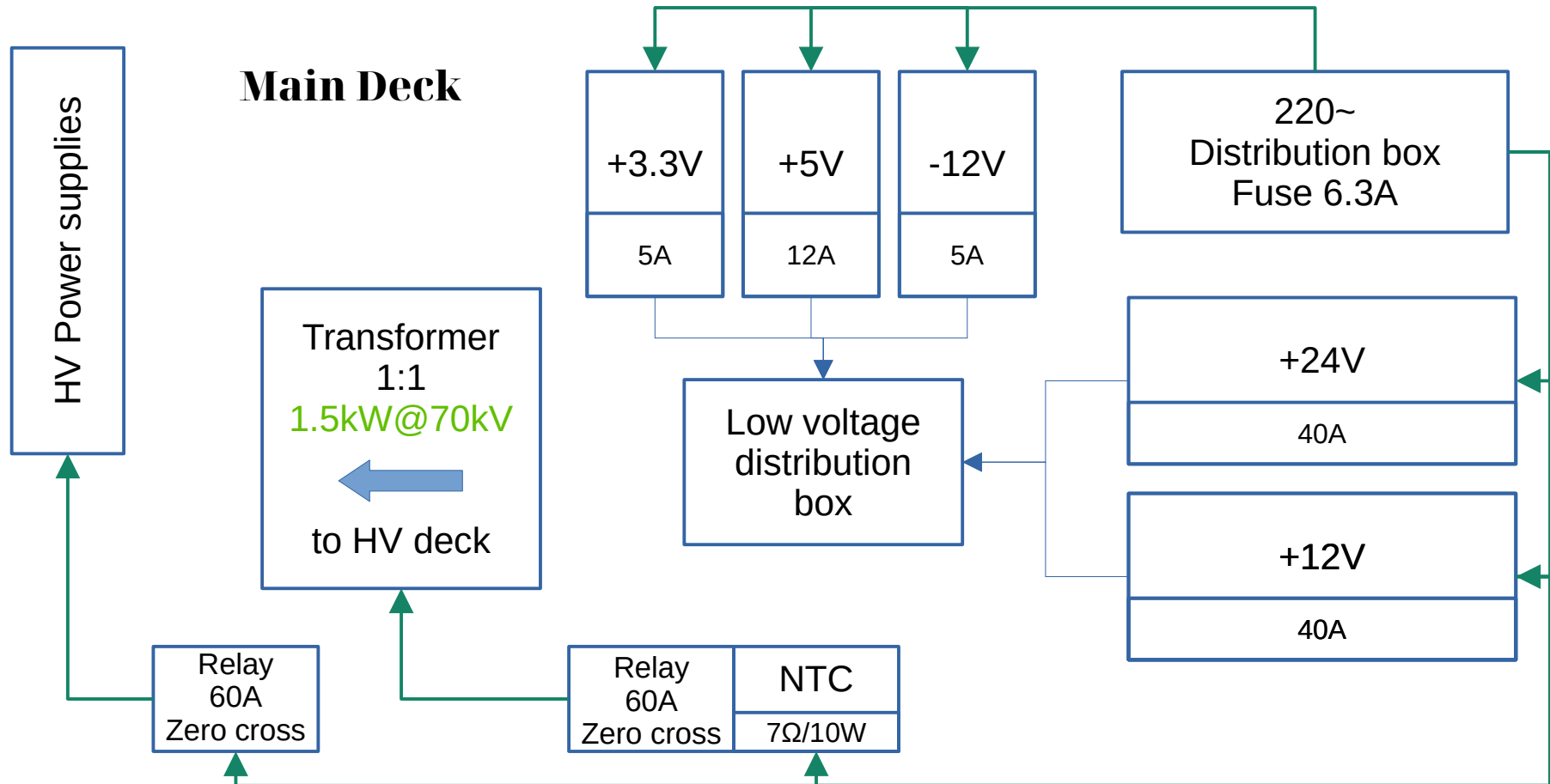
Arduino
+
dedicated
board



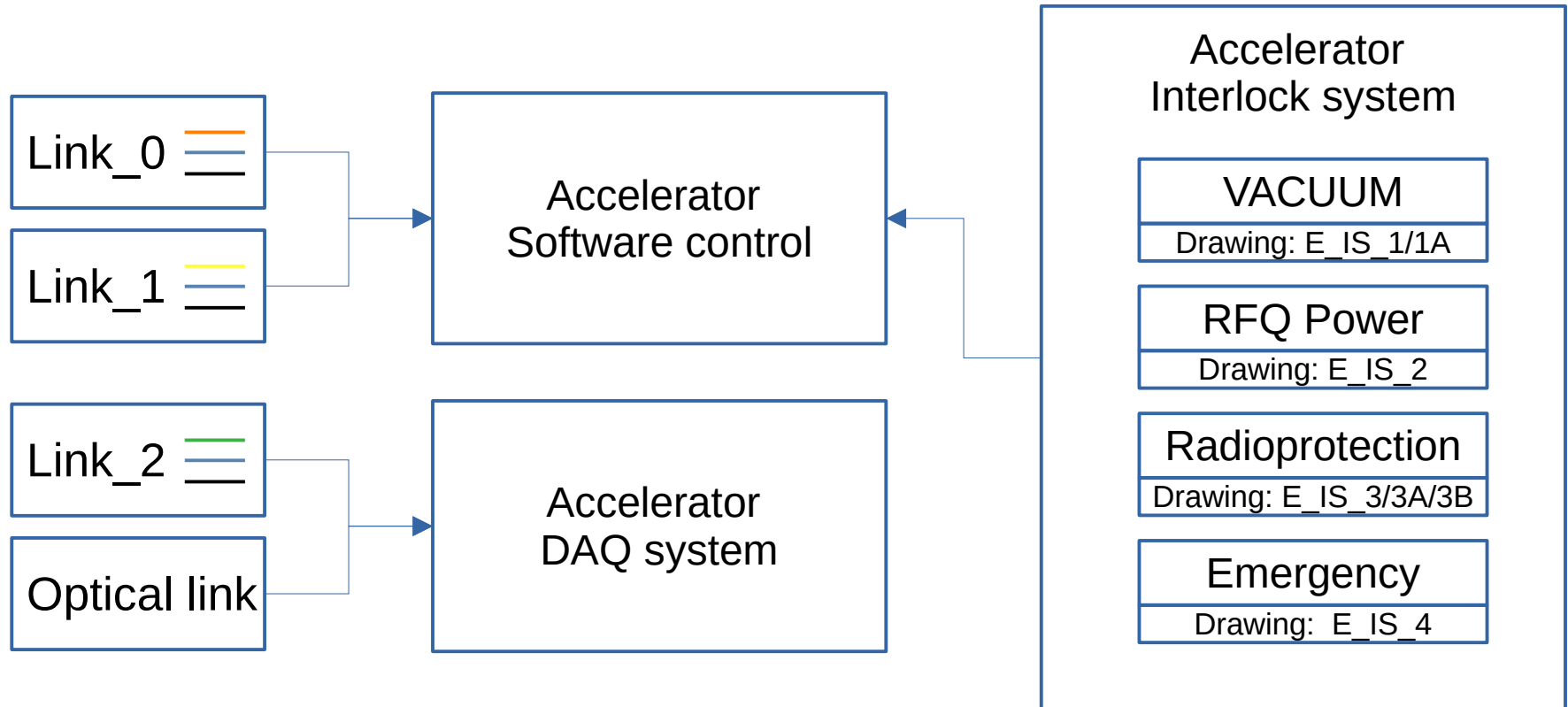
- 1 - Deck-High Energy
- 2 - Deck-High Energy UP
- 3 - Deck-RFQ
- 4 - Deck-High Voltage UP
- 5 - Main Deck
- 6 - Deck-Optical Link
- 7 - Deck-High Voltage



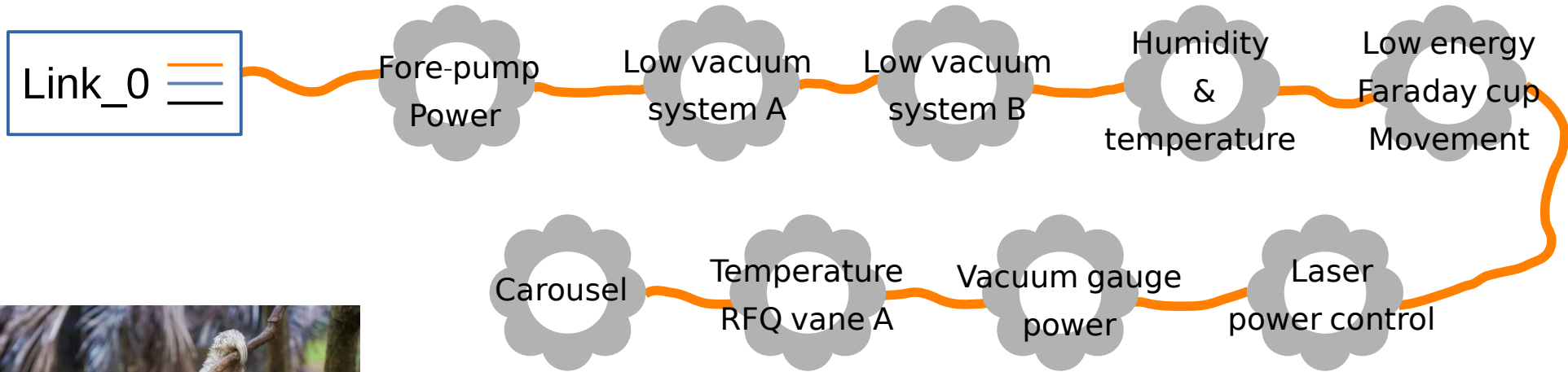
First things first – Low voltage distribution



Communication – RS485 links

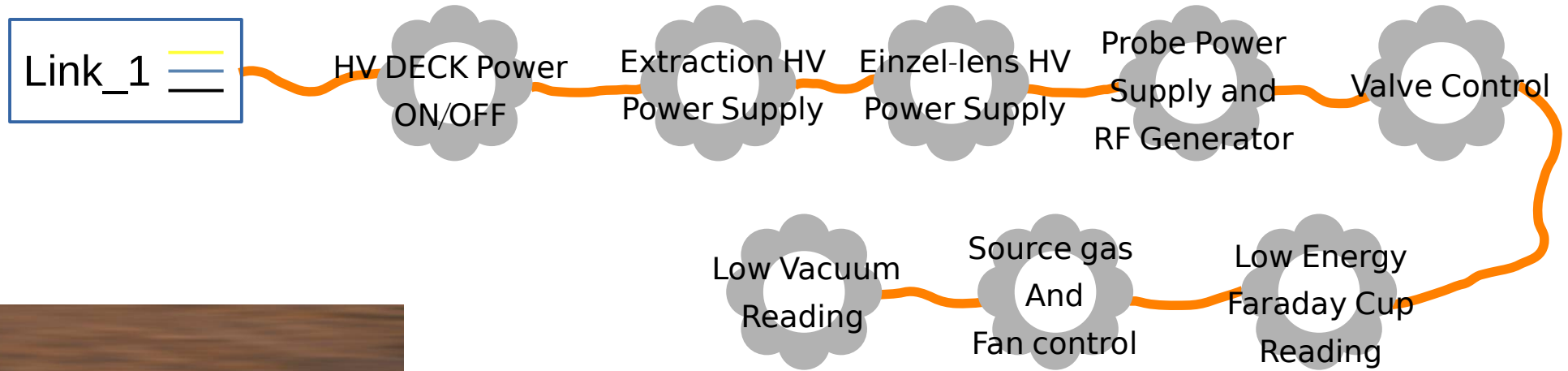


Communication — LINK_0 (9.6kBaud)



The slow line

Communication — LINK_1(57.6kBaud)



The fast line

Control System – **Current Status**

- ☑ Control of all elements such as valves, Faraday cups, vacuum readings, etc.



Vacuum readers power supply control

Ion source HV protection and emergency
button

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Vacuum readers power supply control

Ion source HV protection and emergency
button



Readers are switched on only if turbo pumps are on, and automatically switched off if the pressure $> 10^{-4}$ mBar.

Control System – Current Status

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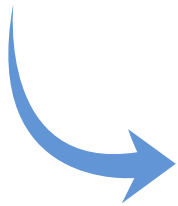


Vacuum readers power supply control



Readers are switched on only if turbo pumps are on, and automatically switched off if the pressure $> 10^{-4}$ mBar.

Ion source HV protection and emergency button



OR



Probe HV enable

Extraction HV enable

Einzel-lens HV enable

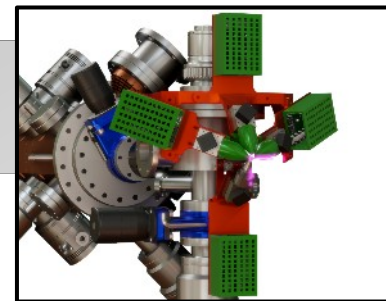
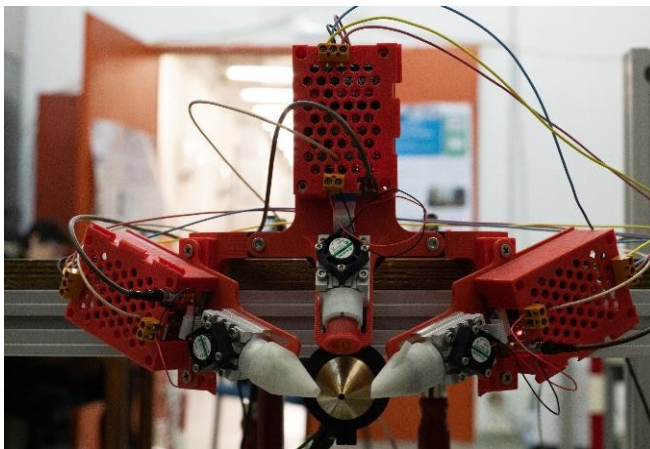


Development of the IBA imaging system of the transportable MACHINA accelerator for Cultural Heritage applications

Candidato: Rodrigo Alberto Torres Saavedra
Relatore: Prof. Lorenzo Giuntini
Correlatore: Dr. Caroline Czelusniak

Acquisition tests – Preliminary tests

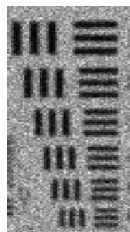
USAF 1951 standard:
3 detectors;
Simultaneous acquisition;
X-ray Fluorescence.



Looking for spatial artifacts



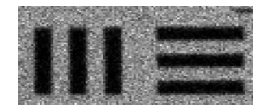
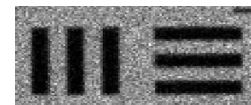
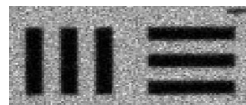
SDD1



SDD2



SDD3

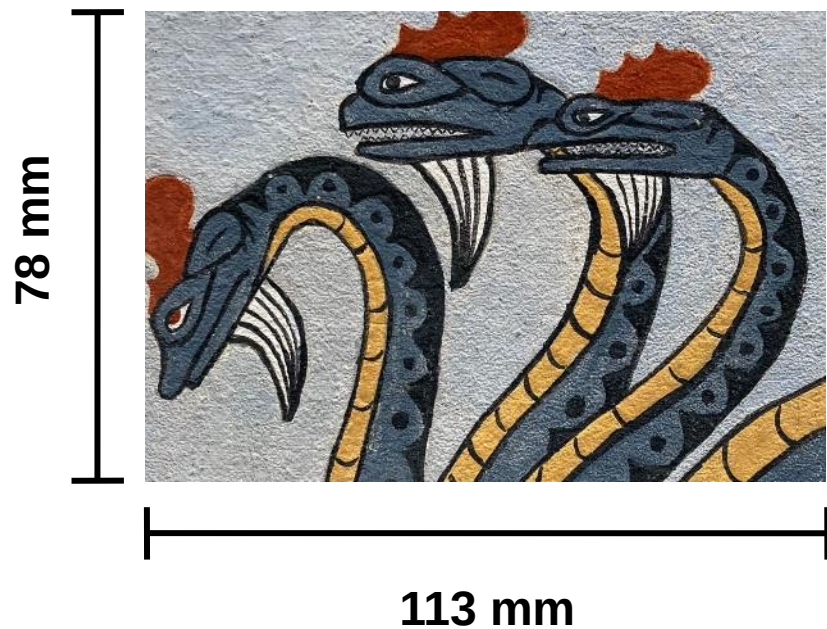


Acquisition tests – Preliminary tests

Raster scan ($\sim 90 \text{ cm}^2$) of a modern replica of an aetruscan fresco

2 SDD

2 MeV pulsed beam



Ti Maps



Grazie!

