

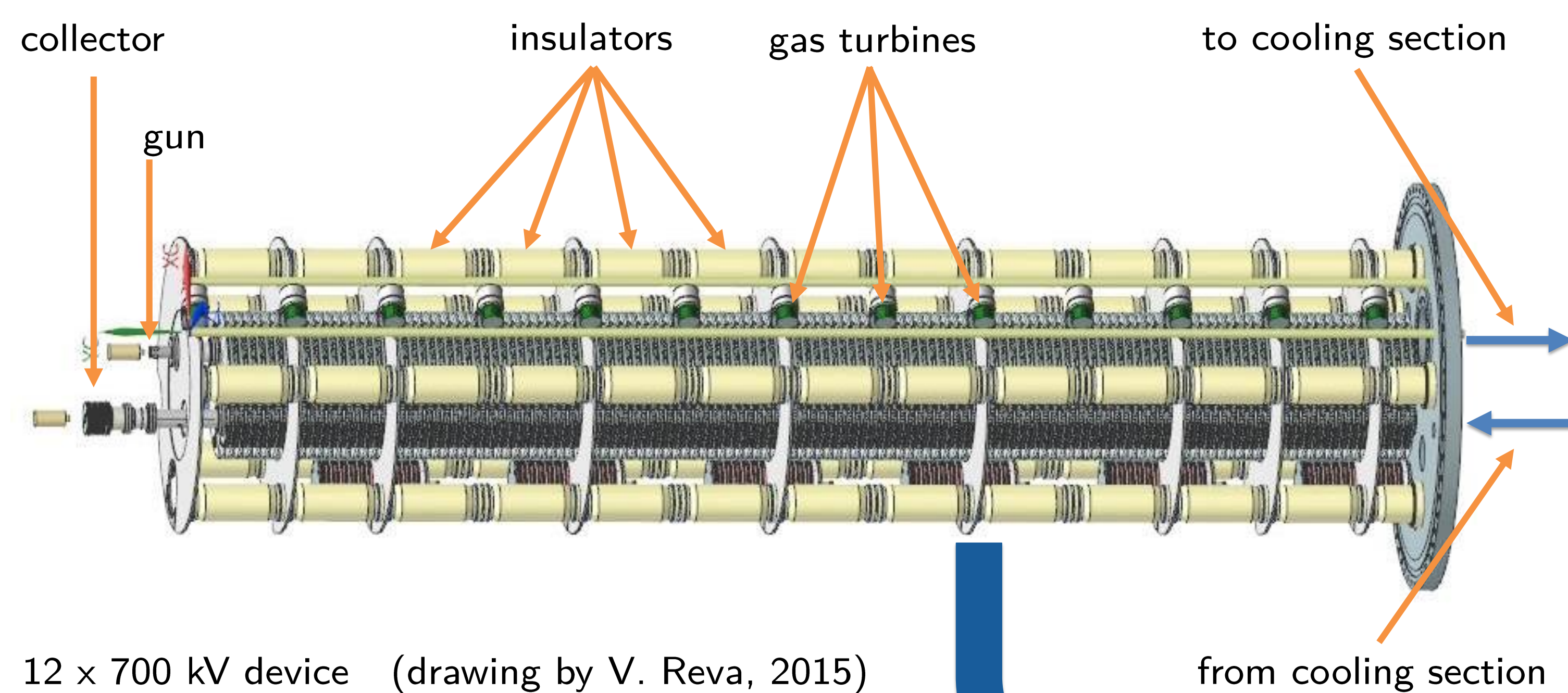
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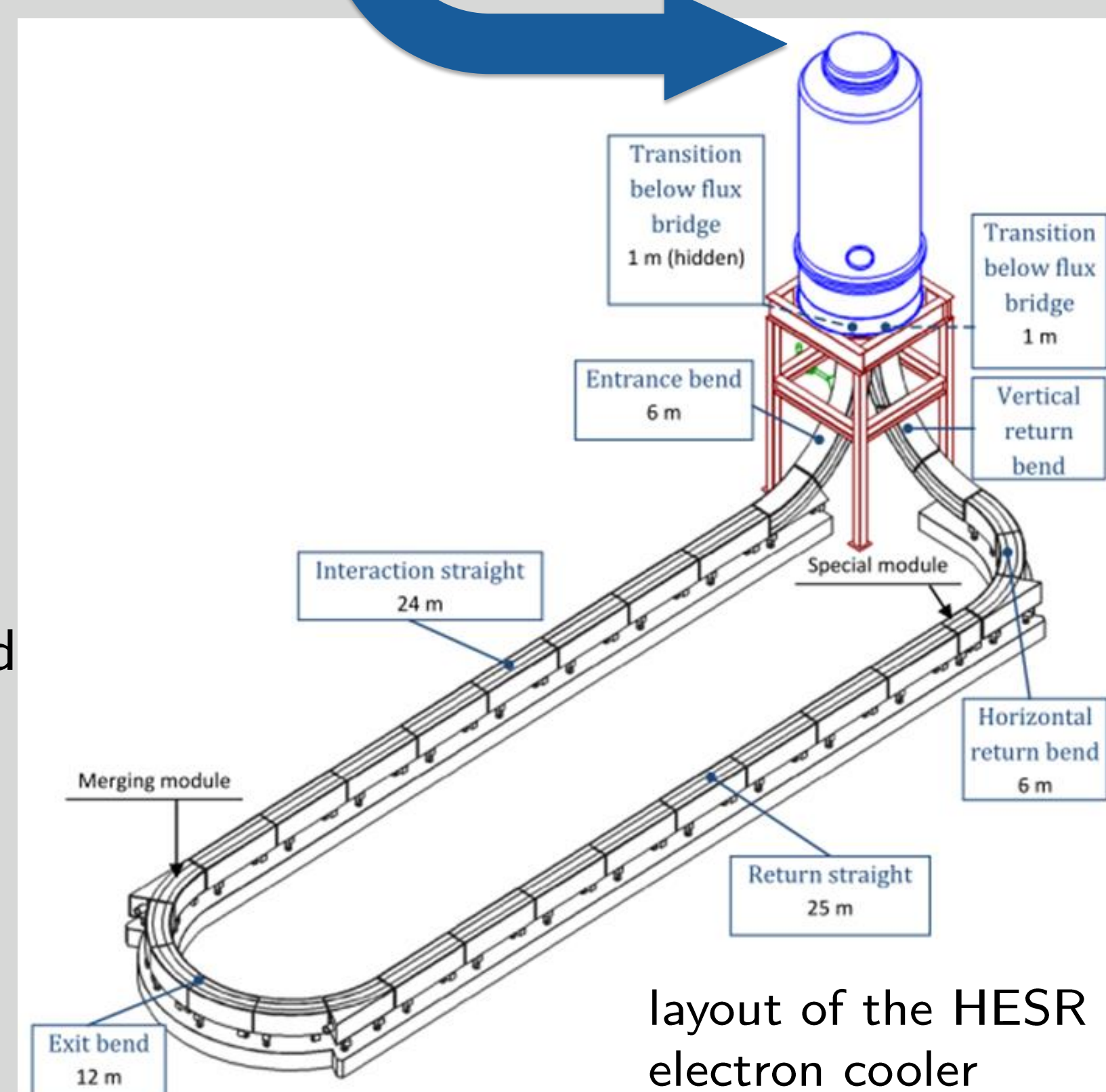
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## VISION OF COMPLETELY MAGNETIZED 8 MeV COOLER



## History

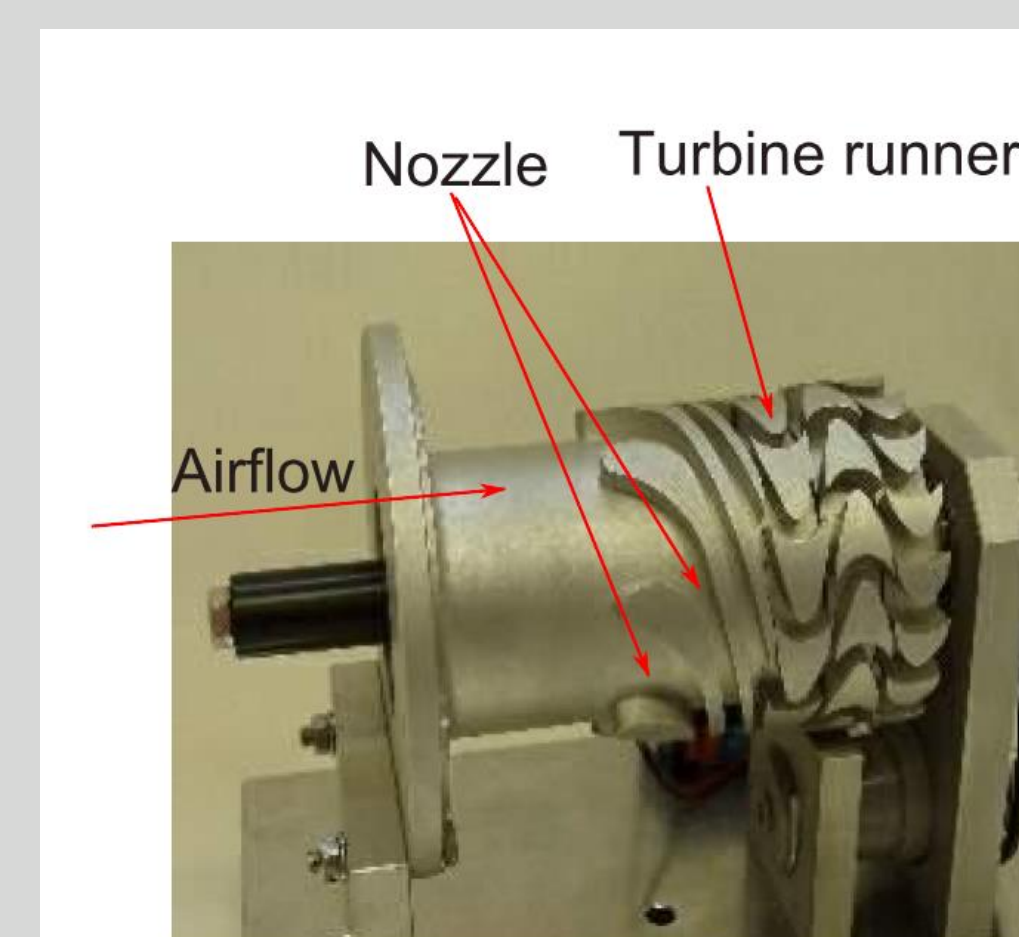
- preliminary studies for COSY cooler
- COSY cooler works fine since commissioning
- COSY design was adapted to new tasks at HESR
- in 2016, BINP was commissioned to build a prototype



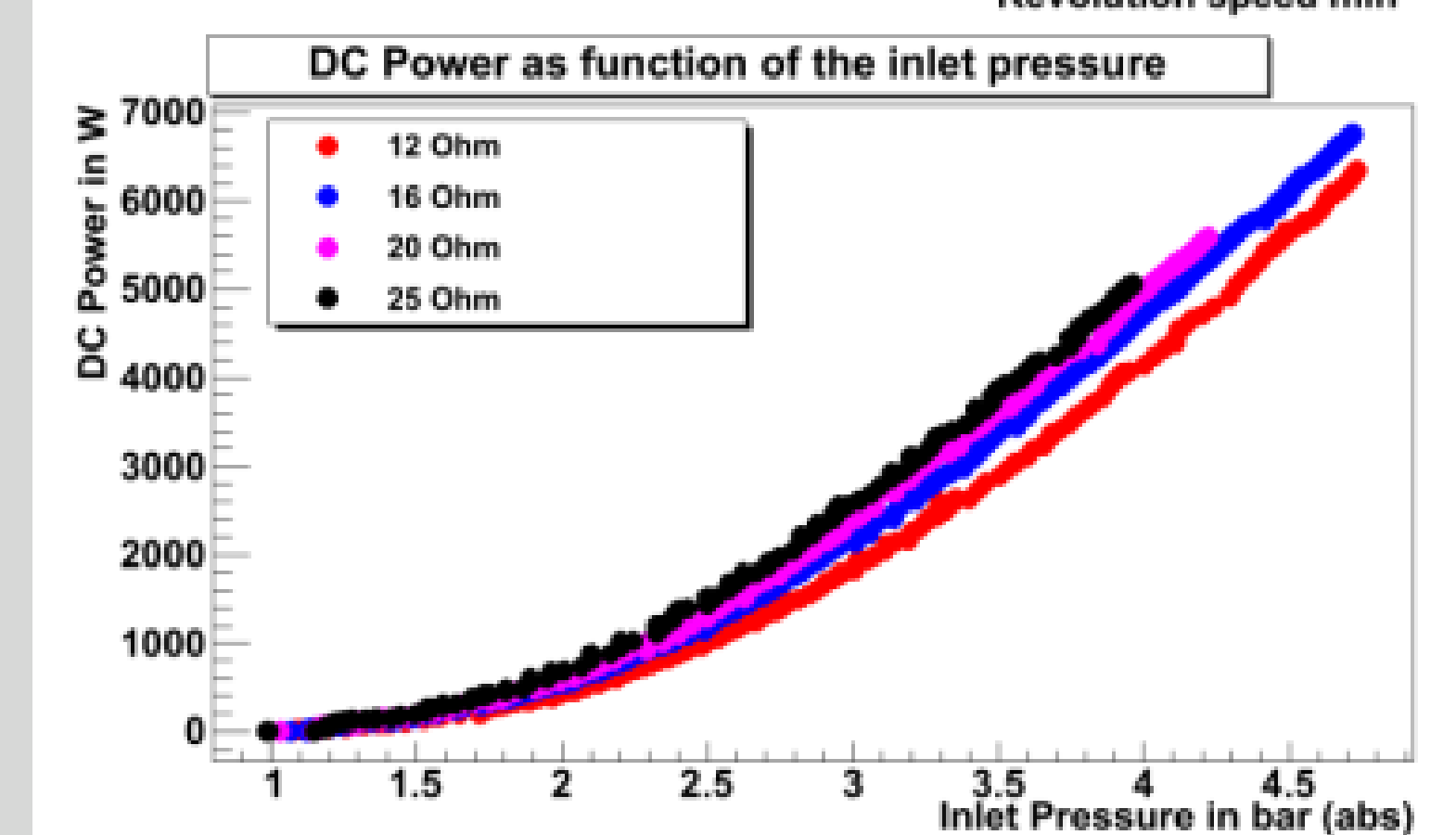
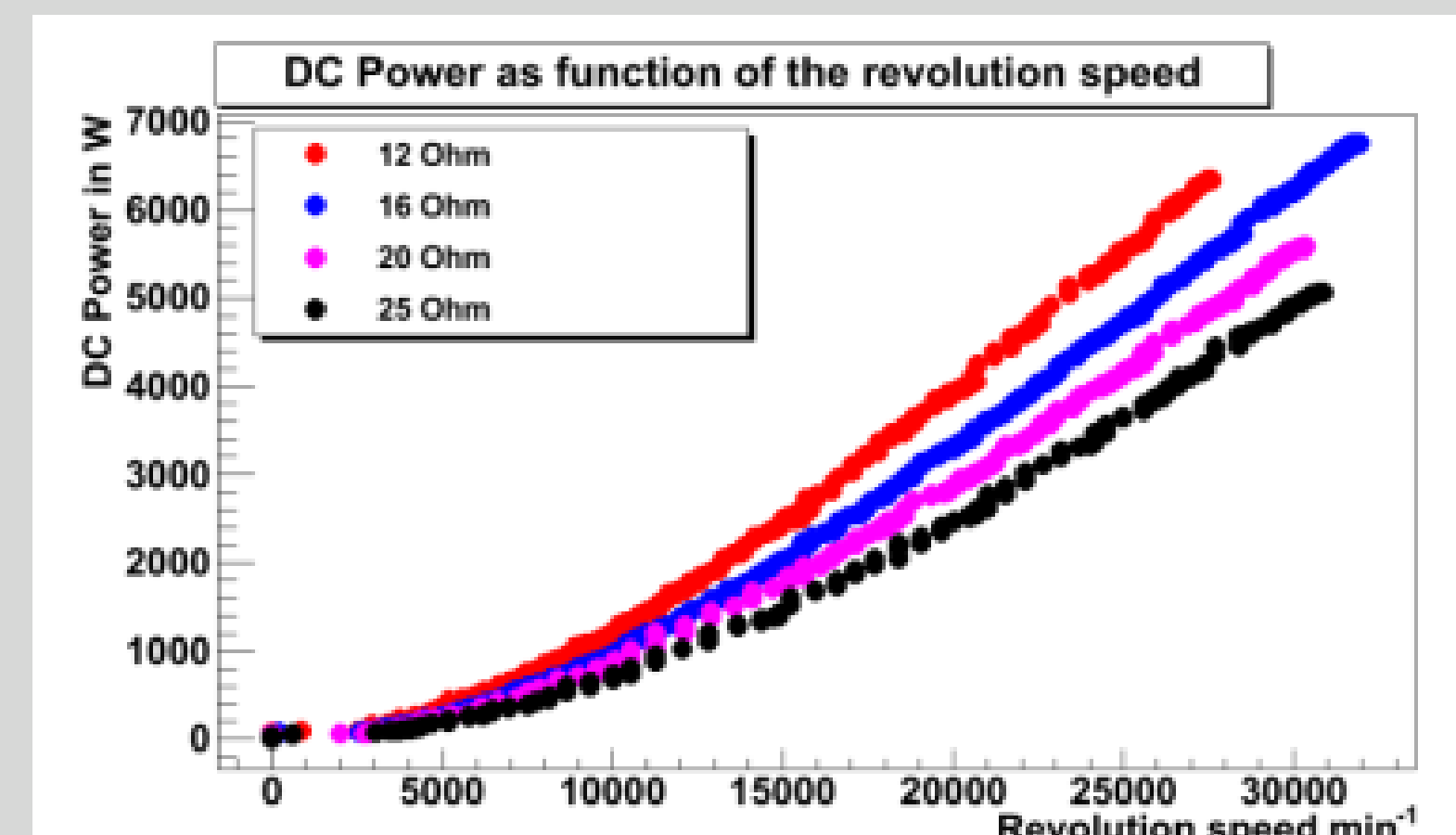
## RELIABILITY TESTS OF TURBINES AT MAINZ TURBINES



~ 40 cm



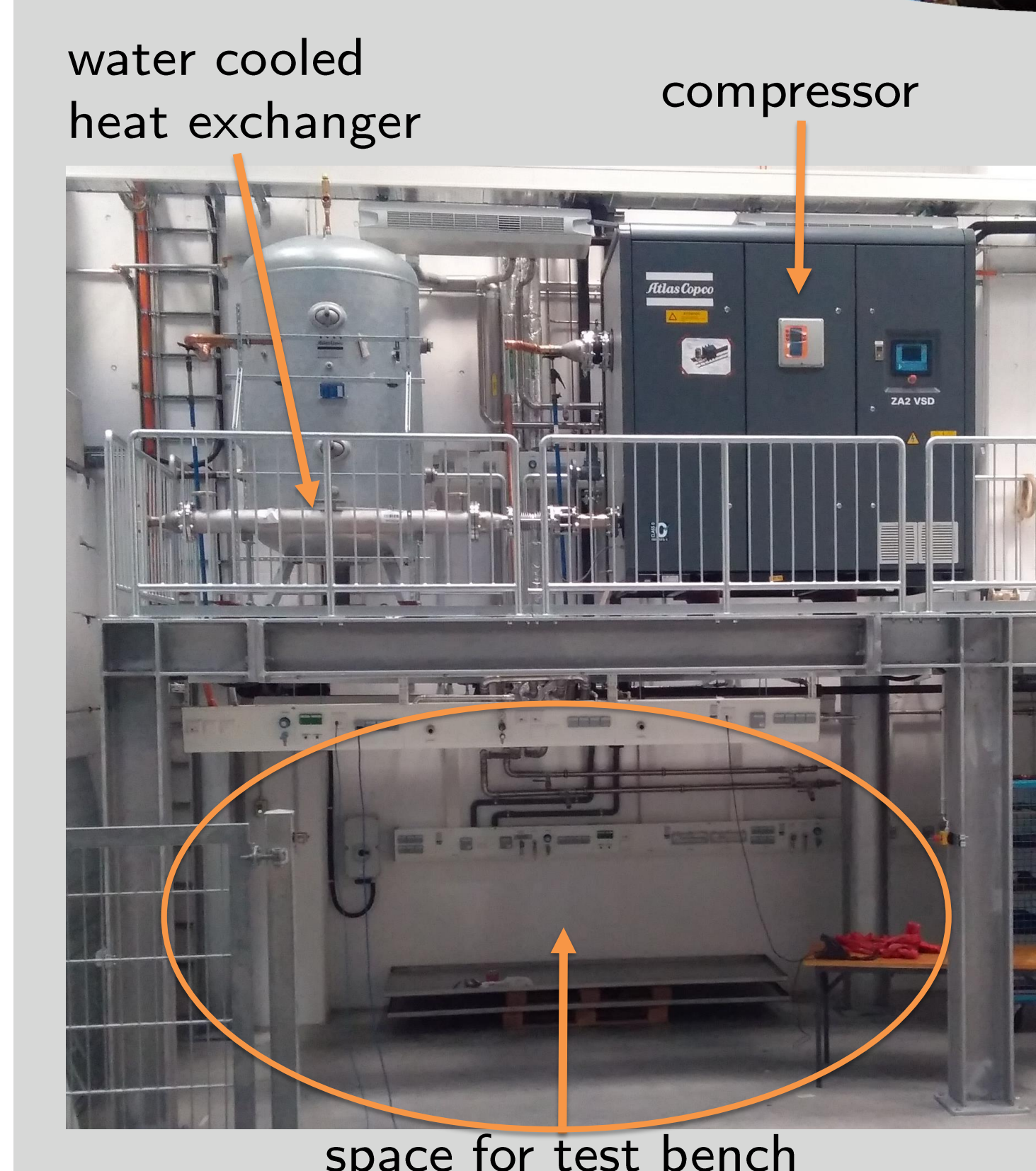
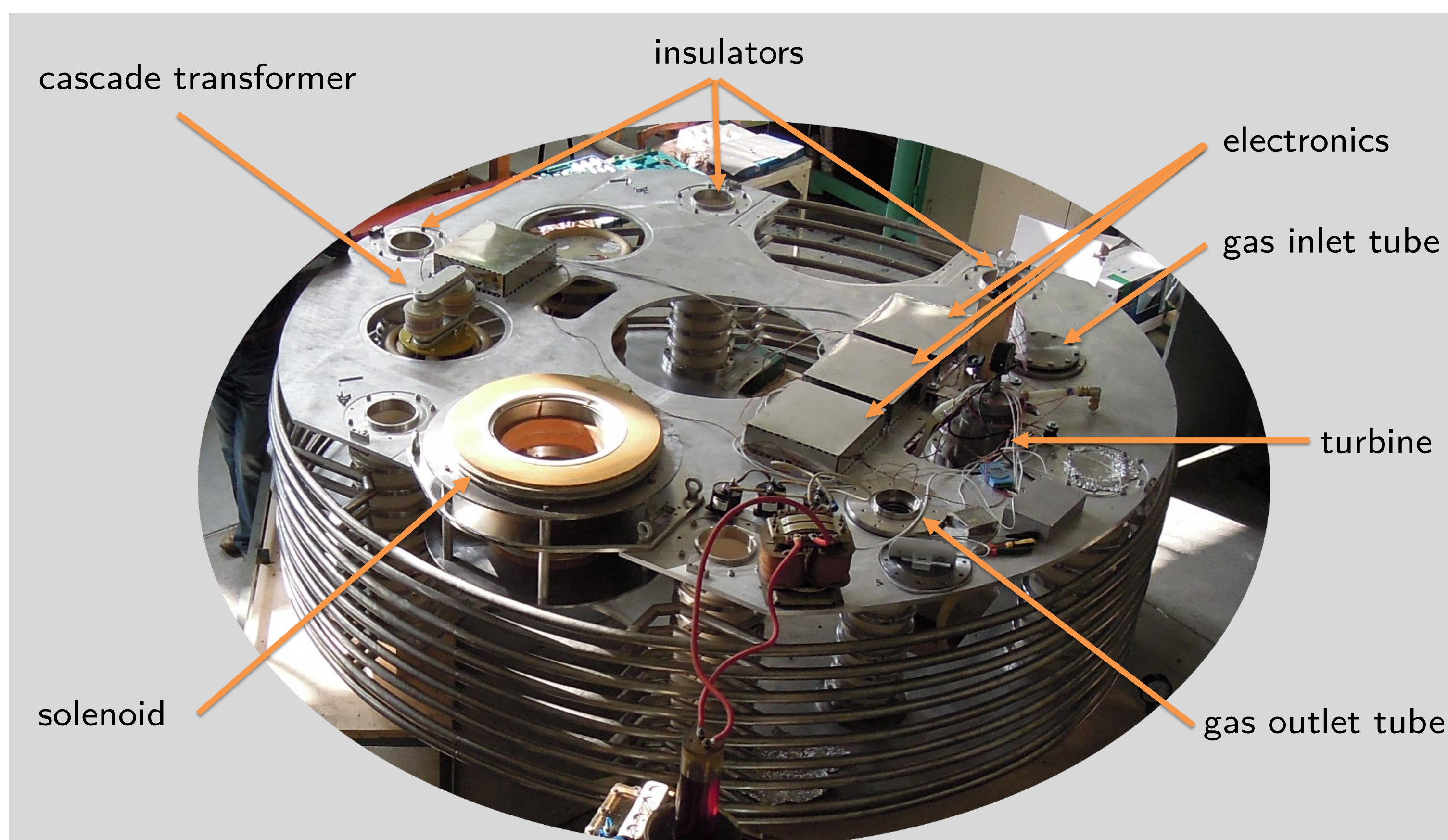
runner of 5 kW turbine



## results and conclusions

- turbine operated > 1000 h without failure at 5 kW
- lubrication of bearings is needed, but minimal
- lubrication unit is modified for 10 bar external pressure
  - successful test of turbine in pressurized vessel in autumn 2015
- closed cycle operation with dry nitrogen seems favorable – test next year
- turbine with gas bearings has been developed by DEPRAG
- turbine powered prototype under construction at BINP
- demonstration of 600 kV Turbo-HV-Generator + solenoid – summer 2018

## ASSEMBLY OF 600 kV TURBINE DRIVEN HV GENERATOR



## compressor

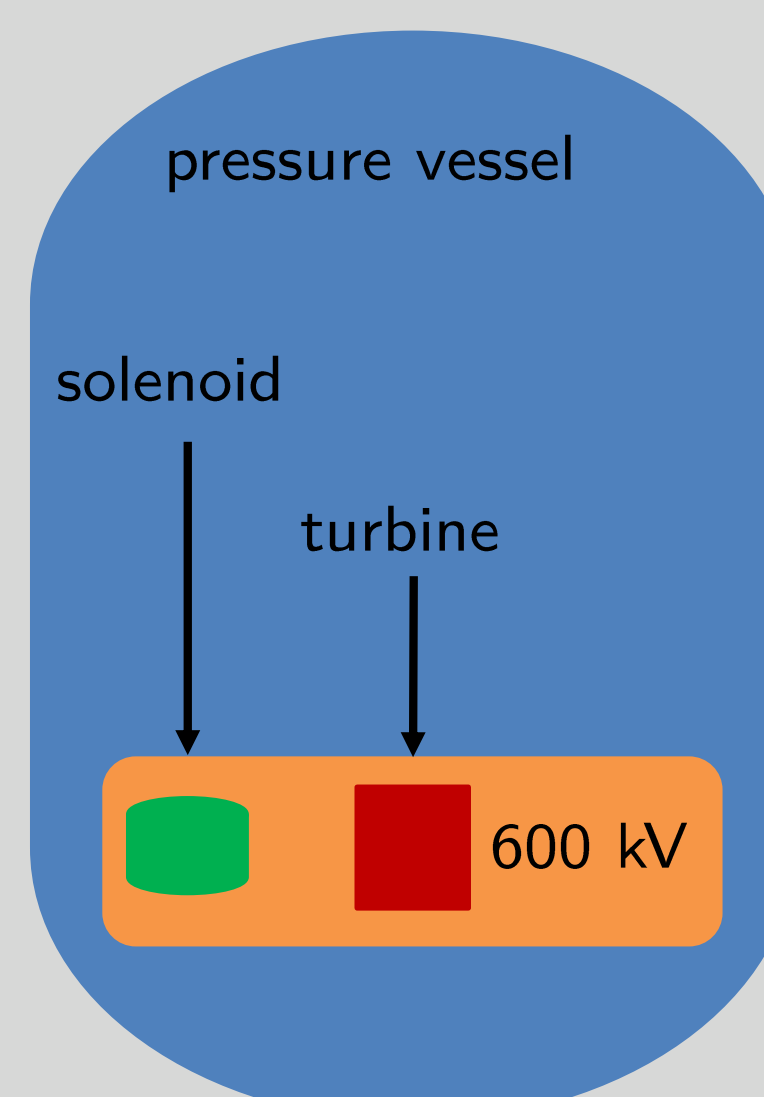
- 4 bar outlet pressure
- enough mass flow to serve up to three turbines
- outlet gas temperature 150°C
- heat exchanger enables to adjust temperatures between 30°C and 150°C

## time schedule

- set specifications of pressure vessel (November 2017)
- order the pressure vessel (January 2018)
- arrival of HV module (March 2018)
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- assembling of HV module inside the pressure vessel (May 2018)
- start with experiments (July 2018)

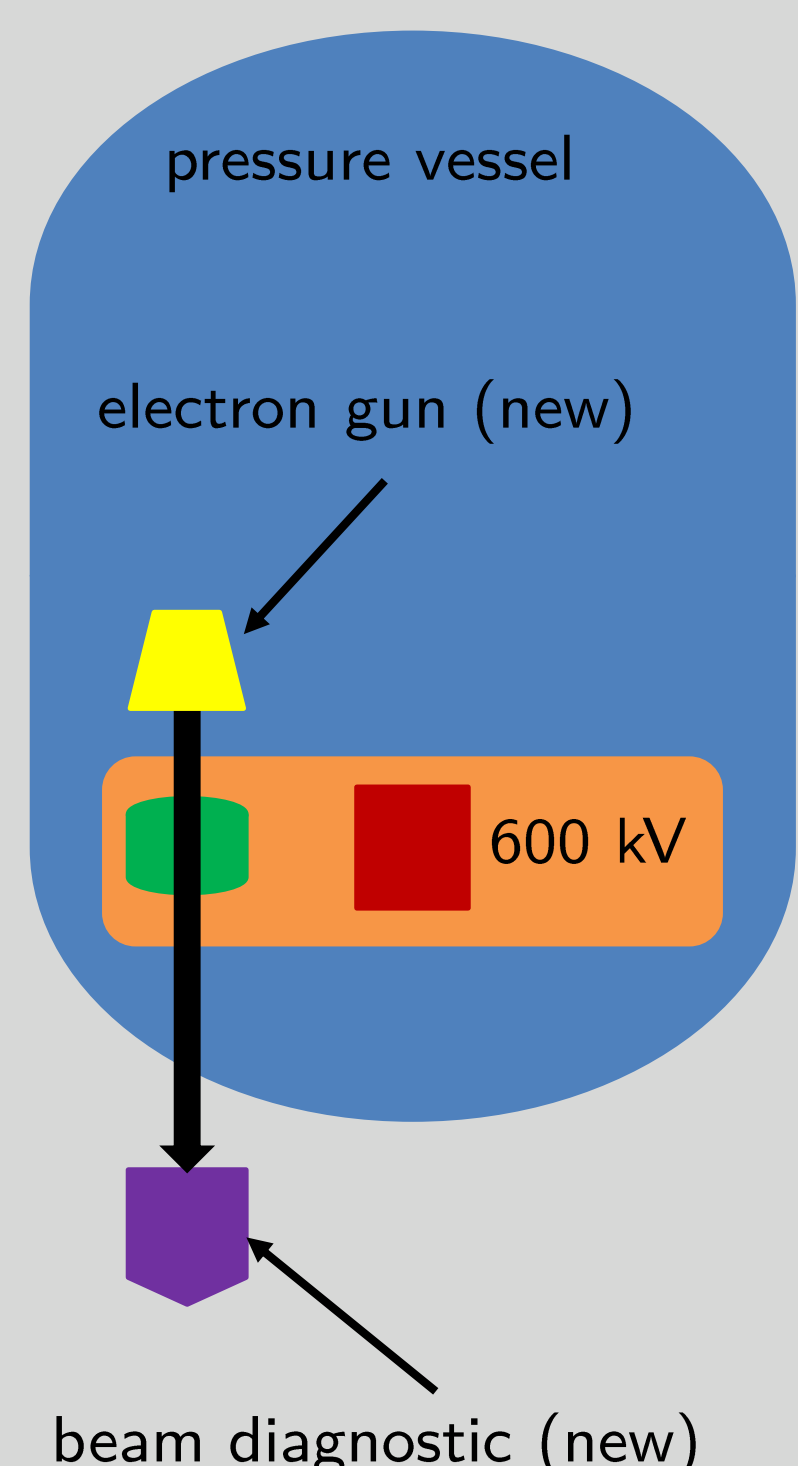
## FURTHER DEVELOPMENTS AND IDEAS

### status end of 2018



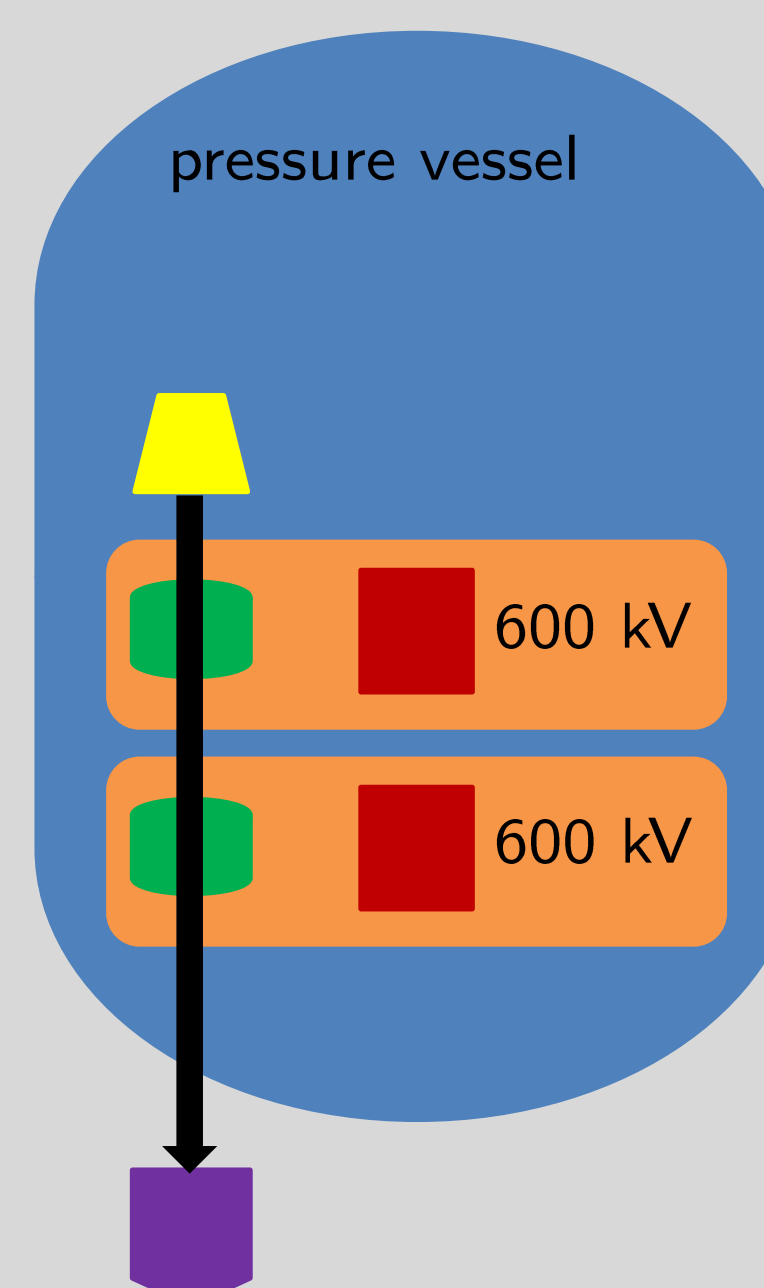
- commissioning of HV module
- powering the solenoid at HV

### first possibility



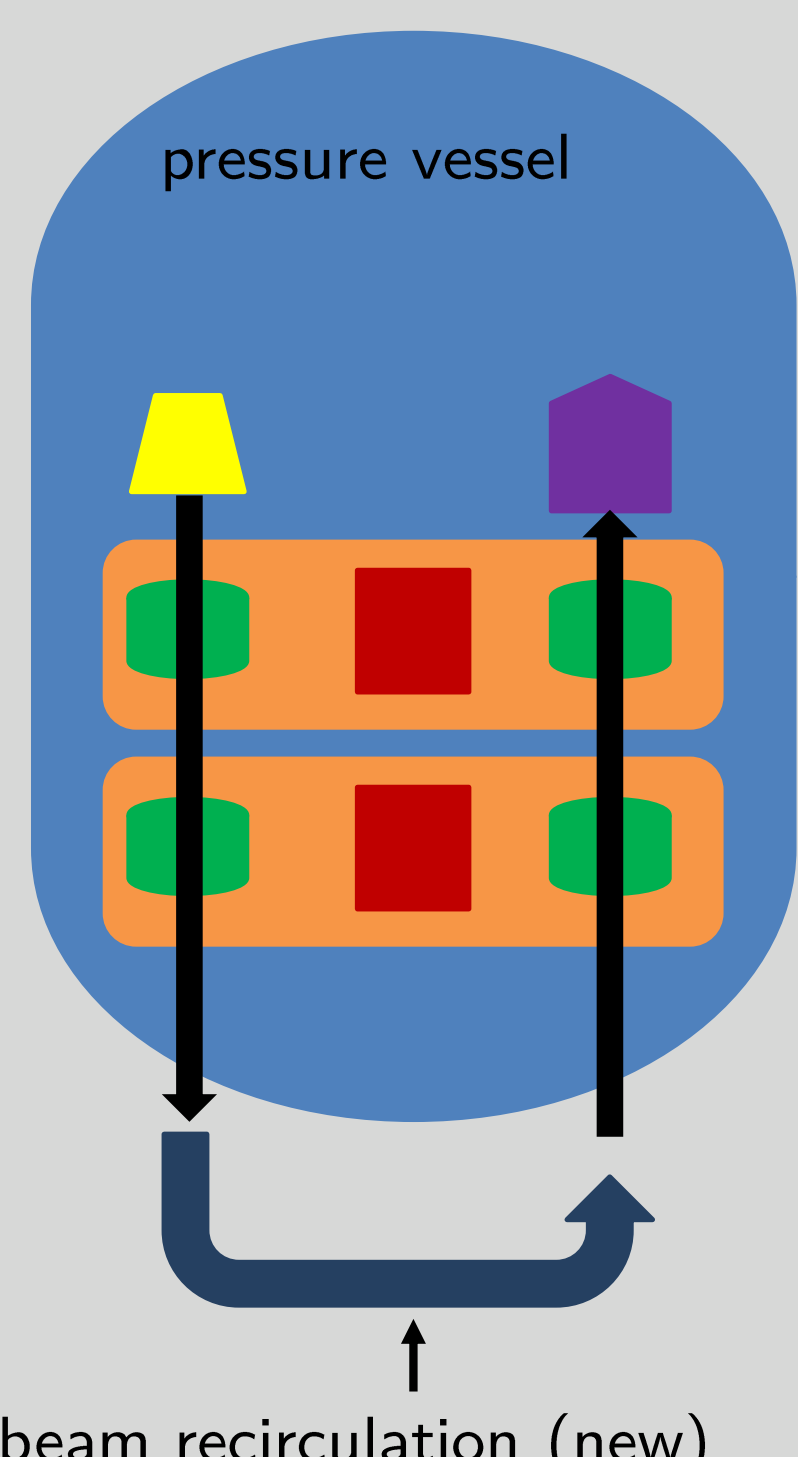
- install a gun and beam diagnostic
- further parameter characterization

### second possibility



- install a 2nd HV module
- increase potential to 1.2 MV
- further parameter characterization

### third possibility



- install necessary solenoids
- install beam recirculation
- produce high electron current
- check if all parts work together