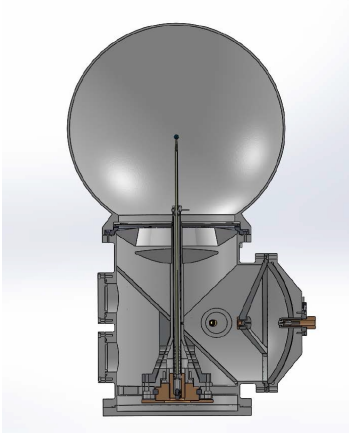
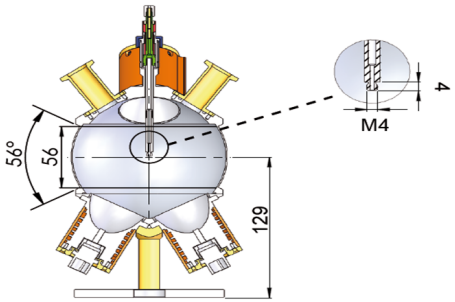
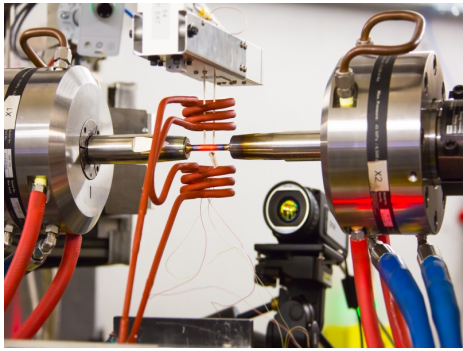
Furnaces

Furnace Designs Used at Neutron Facilities:

- **Paul Scherrer Institute.**
  - ILL style furnace supplied by AS Scientific 300 to 2073K.
  - Small furnace 350 to 700K.
  - Tantalum furnace ILL style 375K to 1400K.
  - Cryo-furnace 2K to 550K.
  - Laser furnace.
- **Institute Laue-Langevin.**
  - ILL style furnace supplied by AS Scientific 300K to 1873K.
  - ILL style furnace supplied by AS Scientific 300K to 1273K.
  - Reflector Furnace 300K to 1923K.
  - Cryo-furnace 1.5K to 550K.
- **ISIS Neutron Facility**
  - ILL style furnace supplied by AS Scientific 300 to 2073K.
  - ILL style furnace supplied by AS Scientific 300 to 1273K.
  - RAL Style furnace 300K to 1273K.
  - Riso furnace 300K to 2273K.
  - Mari furnace 300K to 1173K.
  - Lower temperature furnace 300K to 673K.
  - Reflector furnace 300K to 1400K.
  - Cryo-furnace 1.5K to 600K.
- **FRM II**
  - ILL style furnace supplied by AS Scientific 300 to 2073K.
  - Laser Furnace 300K to 1500K (Herbert Weiß).
  - Reflector furnace 300K to 1400K.
- **Also**
  - Induction furnace (e.g. ORNL)
  - Hot air gun (HEIMDAL team)







Thanks to C. Goodway, M. Christensen

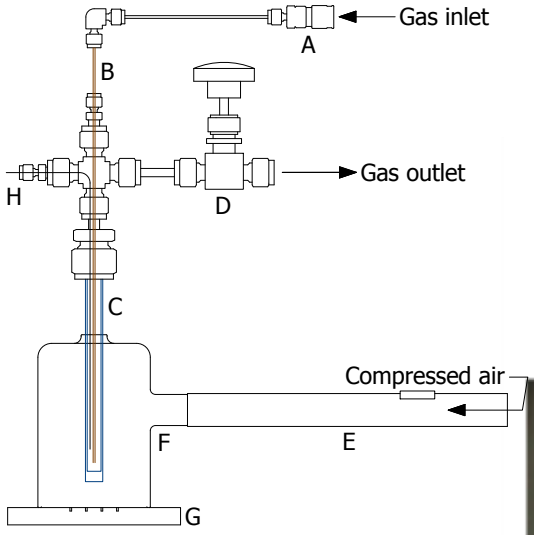
Hot airblower RT-1000 K

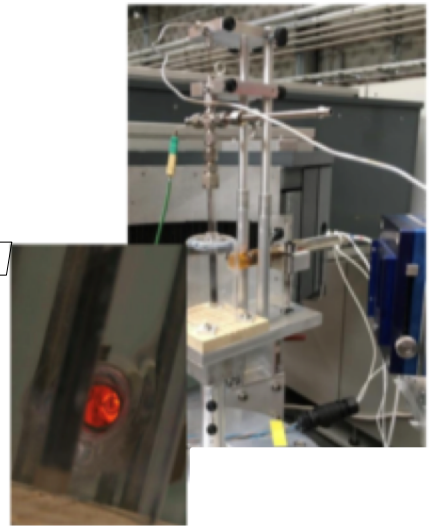
- 1000 W system 40 L/m dry air
- heating to 1000 K in 100s
- combined with gas flow system
- active cooling by dry air => fast sample change

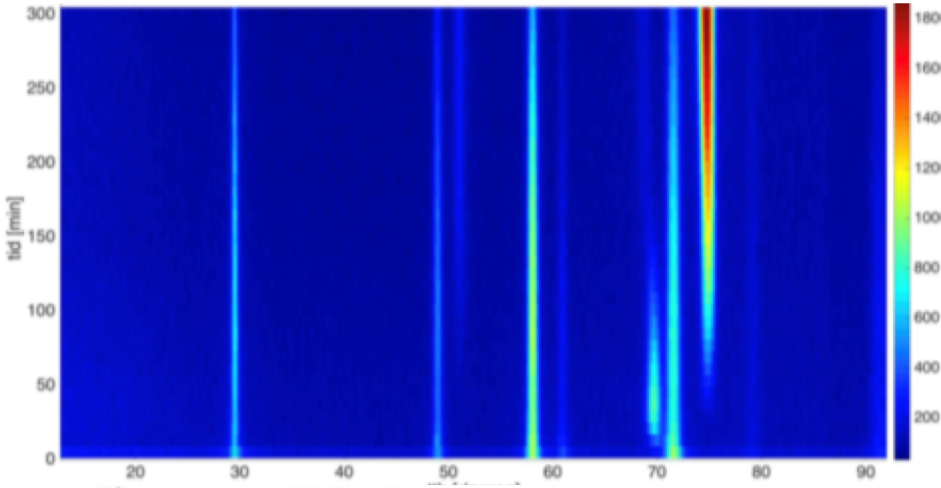
-Test at PSI for in situ reduction experiments of

$-CoFe_2O_4 \text{ –}H_2\text{–>} CoFe_2 + CoFe_2O_4$

-Setup compatible with collaborative robot.







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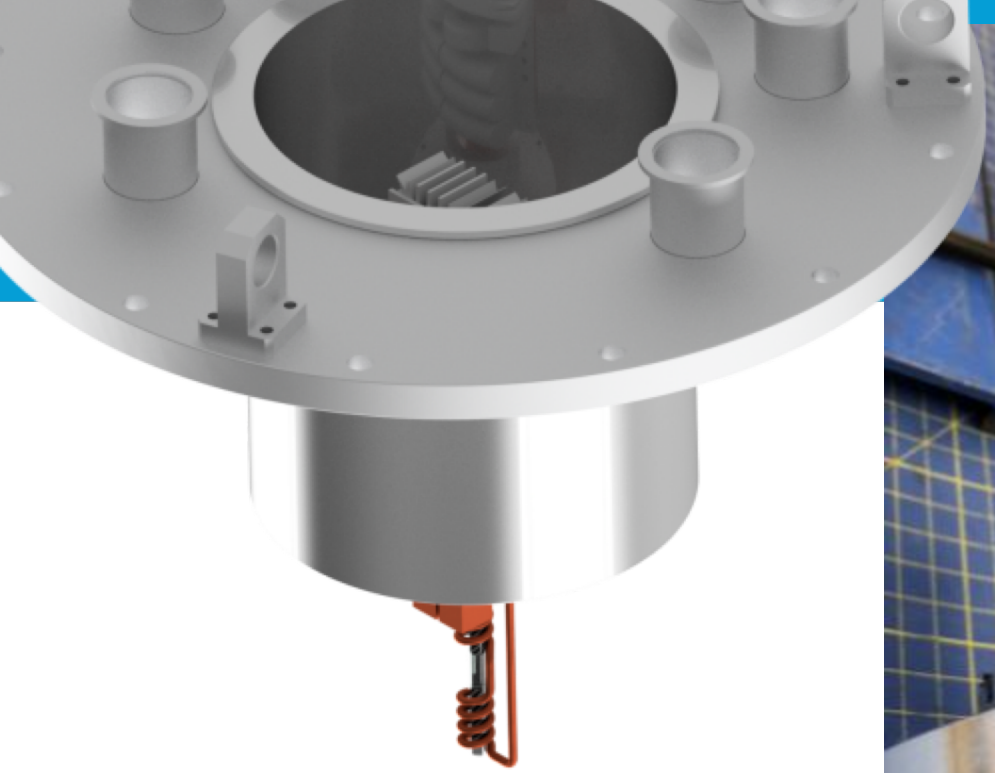

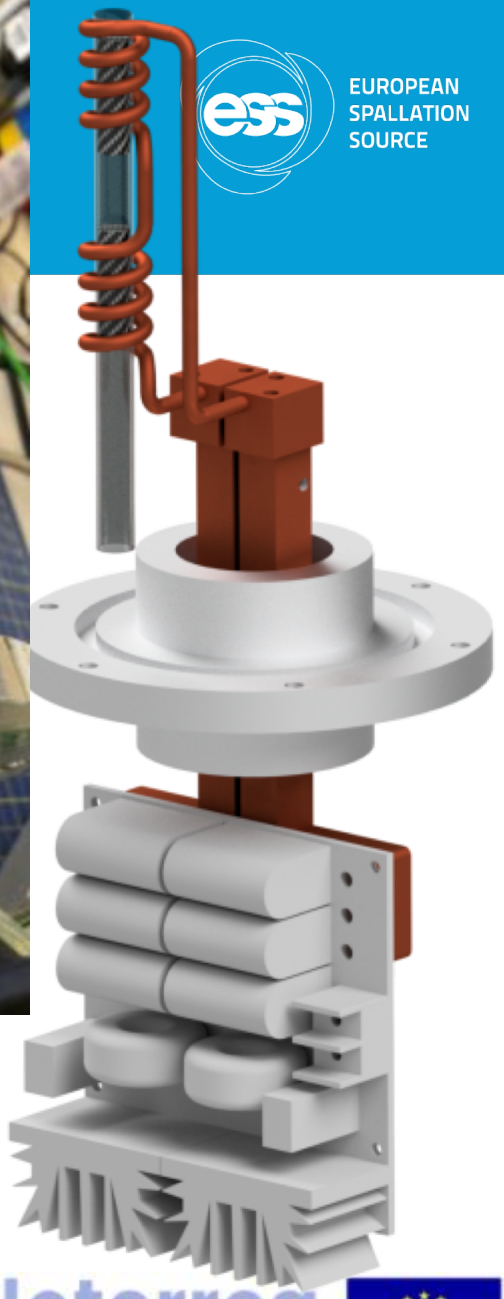

Induction heating system:

- Electromagnetic radiation tested at ISIS
- Vacuum tested
- No beam shadow on Polaris / HEIMDAL
- Fast heating – settling in minutes
- High temperature >1370 °C (only limited by thermocouple)
- Test with beam scheduled for 23th of November 2018

EUROPEAN SPALLATION SOURCE

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Science & Technology Facilities Council ISIS

CHALMERS UNIVERSITY OF TECHNOLOGY

Interreg Öresund-Kattegat-Skagerrak European Regional Development Fund

EUROPEAN UNION

Questions

- Temperature range – combine with cryo?
- Type of sample (metallic, insulating, powder, single crystal)
- Sample size/shape, reactivity, holder type/material
- Gas loading
- Geometry
- Measurement time