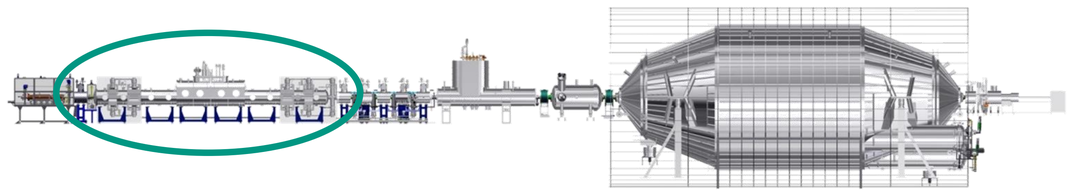
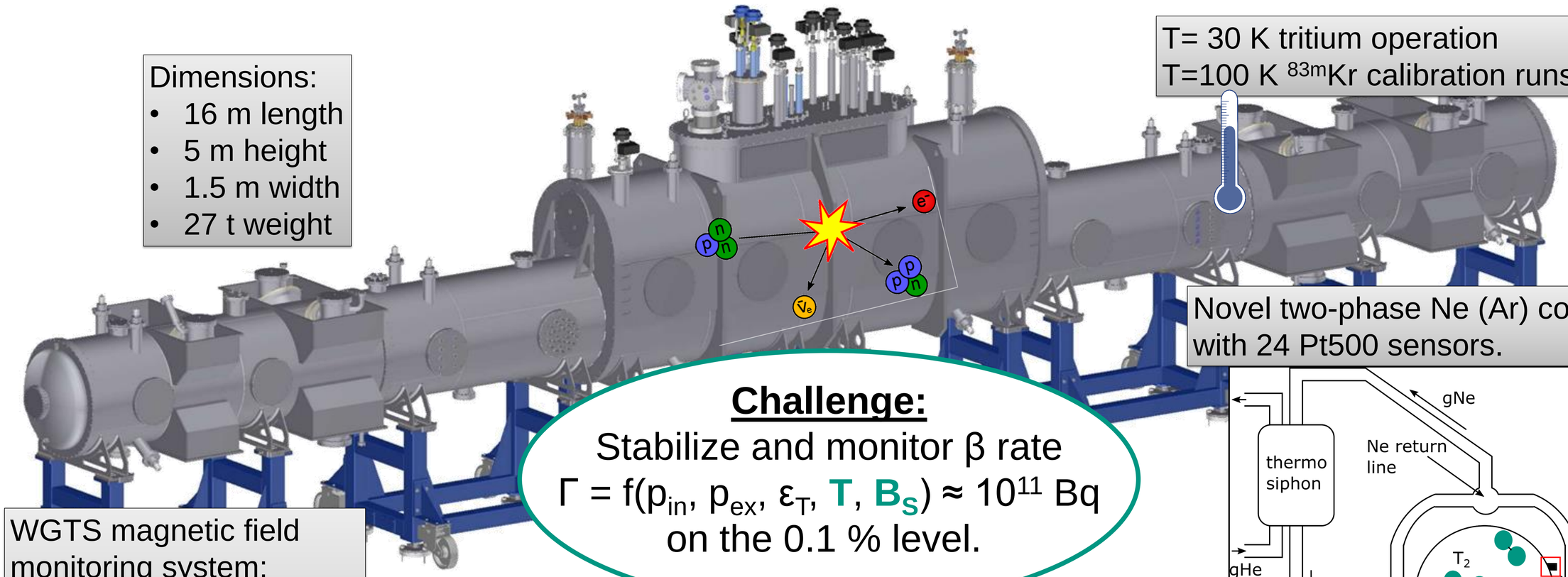
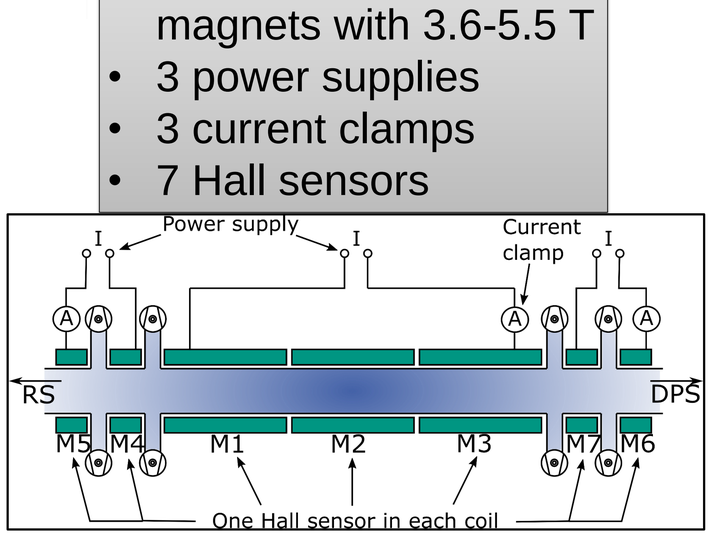
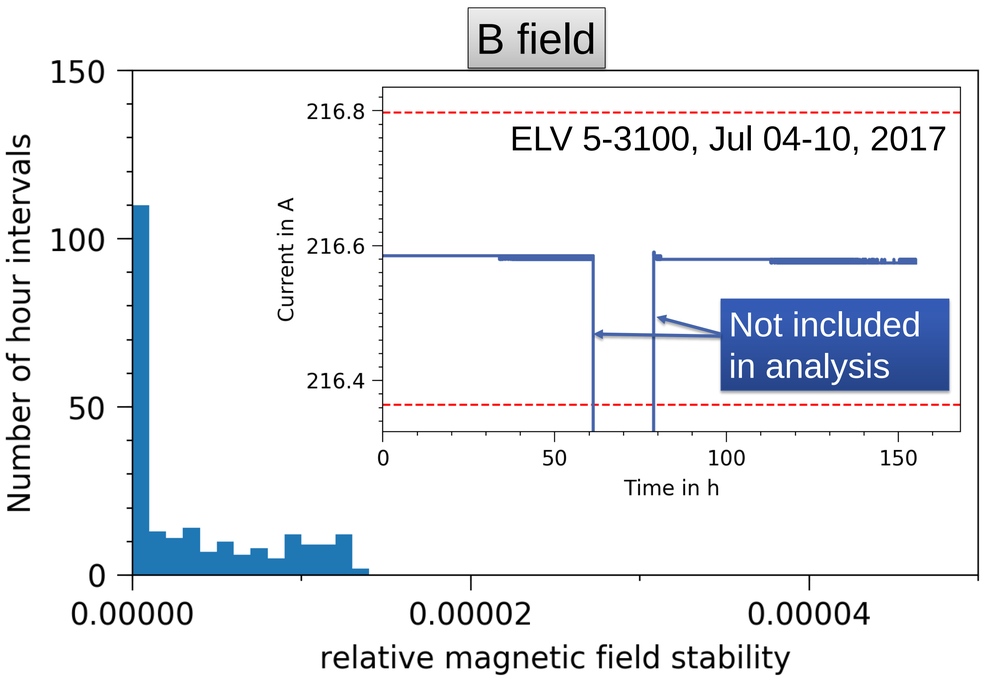
First stability measurements of the KATRIN WGTS cryostat performance

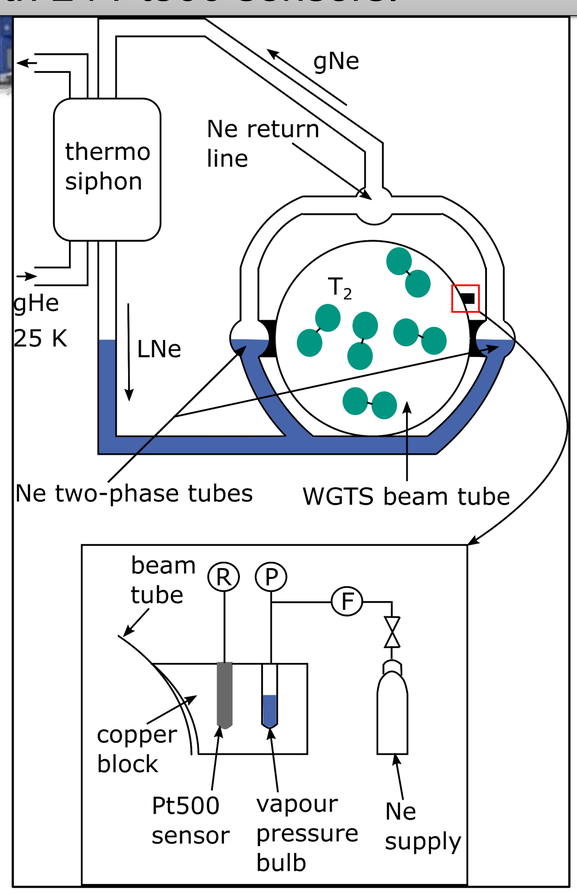
Hendrik Seitz-Moskaliuk for the KATRIN Collaboration

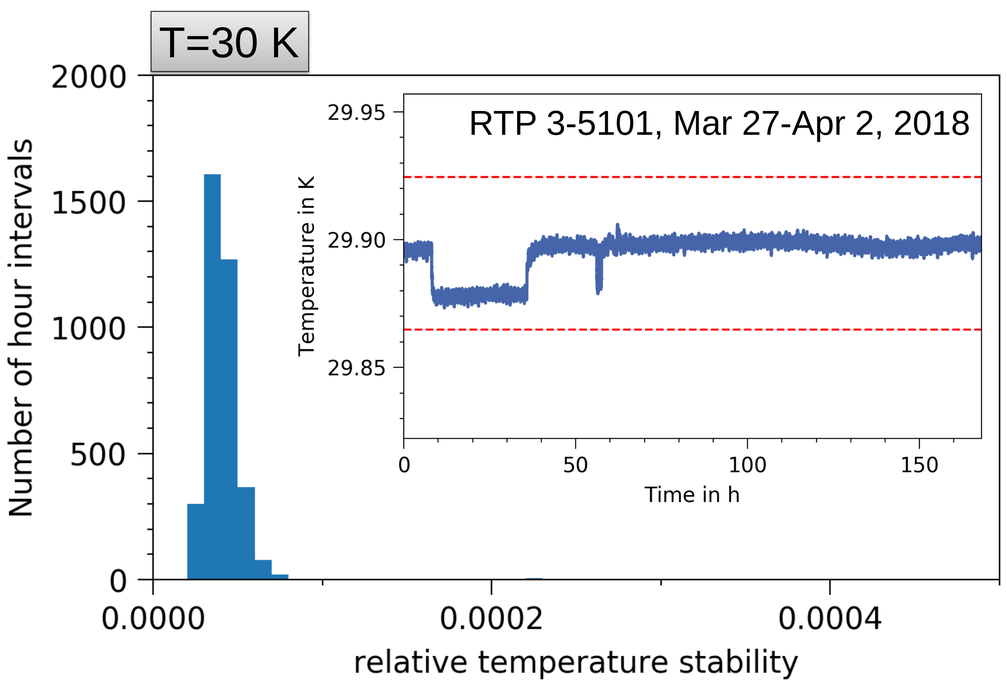






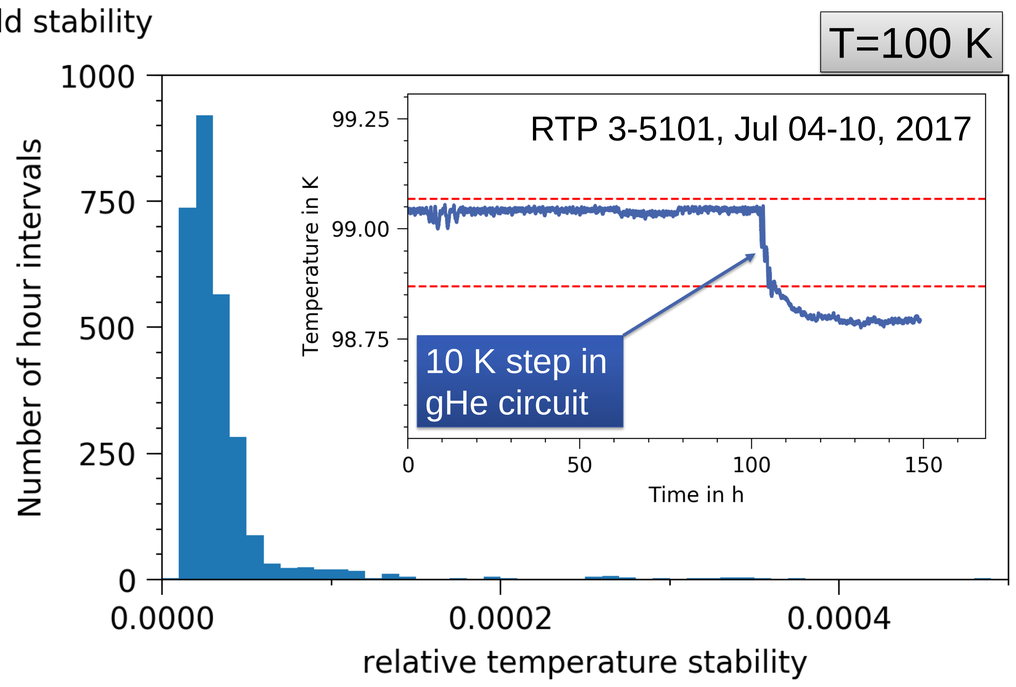






Relative stability = standard deviation/mean

Red lines: Benchmark of 10^{-3}



Results:
- Temperature stability at 30 K: $\Delta T/T < 1.0 \cdot 10^{-4}$ per hour
- Temperature stability at 100 K: $\Delta T/T < 2.0 \cdot 10^{-4}$ per hour
- Magnetic field stability: : $\Delta B/B < 2.0 \cdot 10^{-5}$ per hour

Excellent performance of WGTS cryostat:
Improved β-stability and reduced systematics

We acknowledge the support of Helmholtz Association (HGF), Ministry for Education and Research BMBF (05A17PM3, 05A17PX3, 05A17VK2, and 05A17WO3), Helmholtz Alliance for Astroparticle Physics (HAP), and Helmholtz Young Investigator Group (VH-NG-1055) in Germany; Ministry of Education, Youth and Sport (CANAM-LM2011019), cooperation with the JINR Dubna (3+3 grants) 2017–2019 in the Czech Republic; and the Department of Energy through grants DE-FG02-97ER41020, DE-FG02-94ER40818, DE-SC0004036, DE-FG02-97ER41033, DE-FG02-97ER41041, DE-AC02-05CH11231, and DE-SC0011091 in the United States.