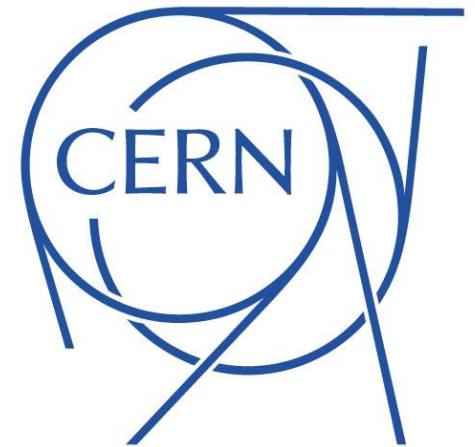


# Preparation of Excited Positronium for GBAR

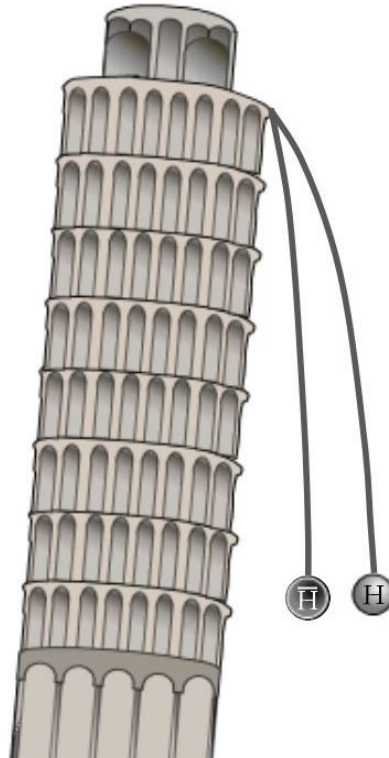


Eric Putney  
17 July, 2019



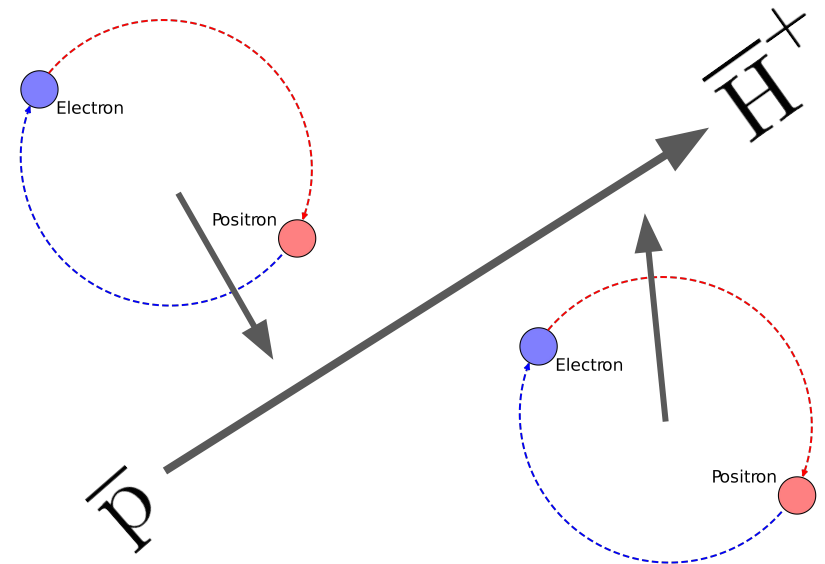
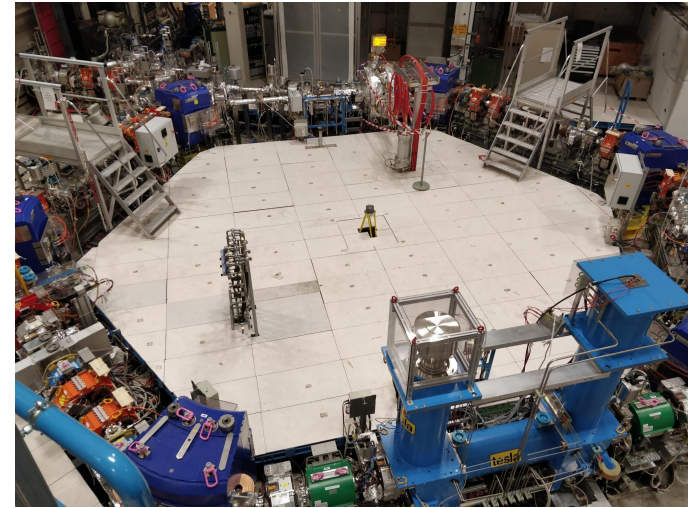
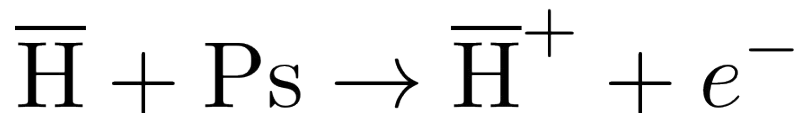
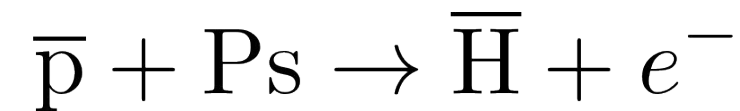
# Gravitational Behavior of Antihydrogen at Rest (GBAR)

- ❖ Drop neutral antihydrogen, calculate  $\bar{g}$ .
- ❖ Tests weak equivalence principle for antimatter:
  - Does inertial mass = gravitational mass?
  - \*\*anti-gravity??\*\* 🤖
- ❖ Probes matter-antimatter asymmetry.



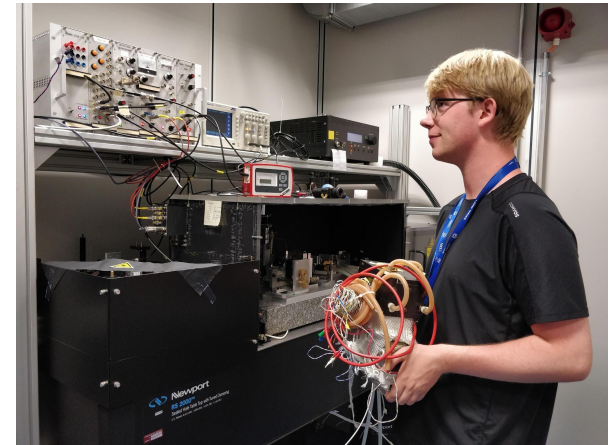
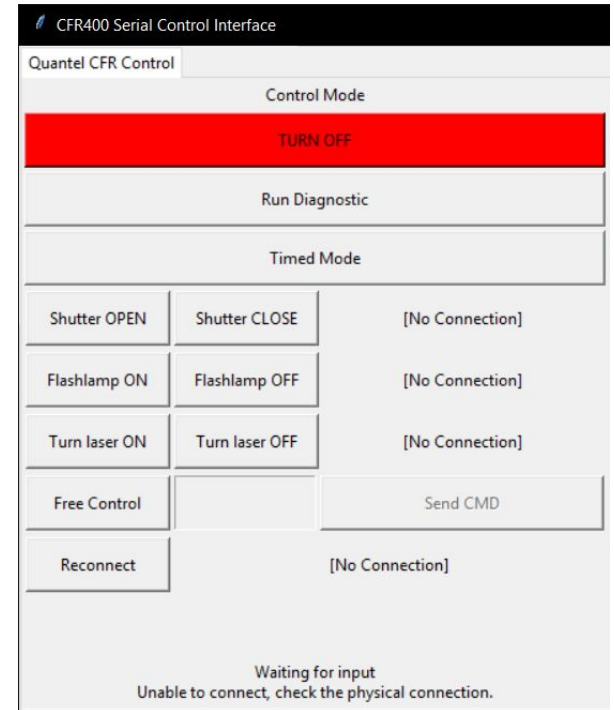
# Positronium & Antihydrogen

- ❖ Need to steer and drop neutral antihydrogen.
- ❖ Solution: Produce positively charged antihydrogen, later remove the extra positron.
- ❖ Accomplished by the double-capture of positronium.



# What I'm doing:

- ❖ Developed control interface for the pulsed positronium excitation laser. (✓)
- ❖ PID stabilization of laser frequency. (〰)
- ❖ Develop remote diagnostics and safety interlocks. (〰)
- ❖ Calibrate frequency against a Cesium transition. (✗)
- ❖ Beam transport from laser hut to reaction chamber. (✗)





# Travel & Stuff:

## Zermatt, Switzerland



# Questions?