



#askCERN

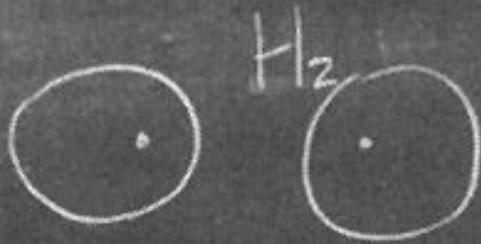
Hangout with CERN: Antimatter

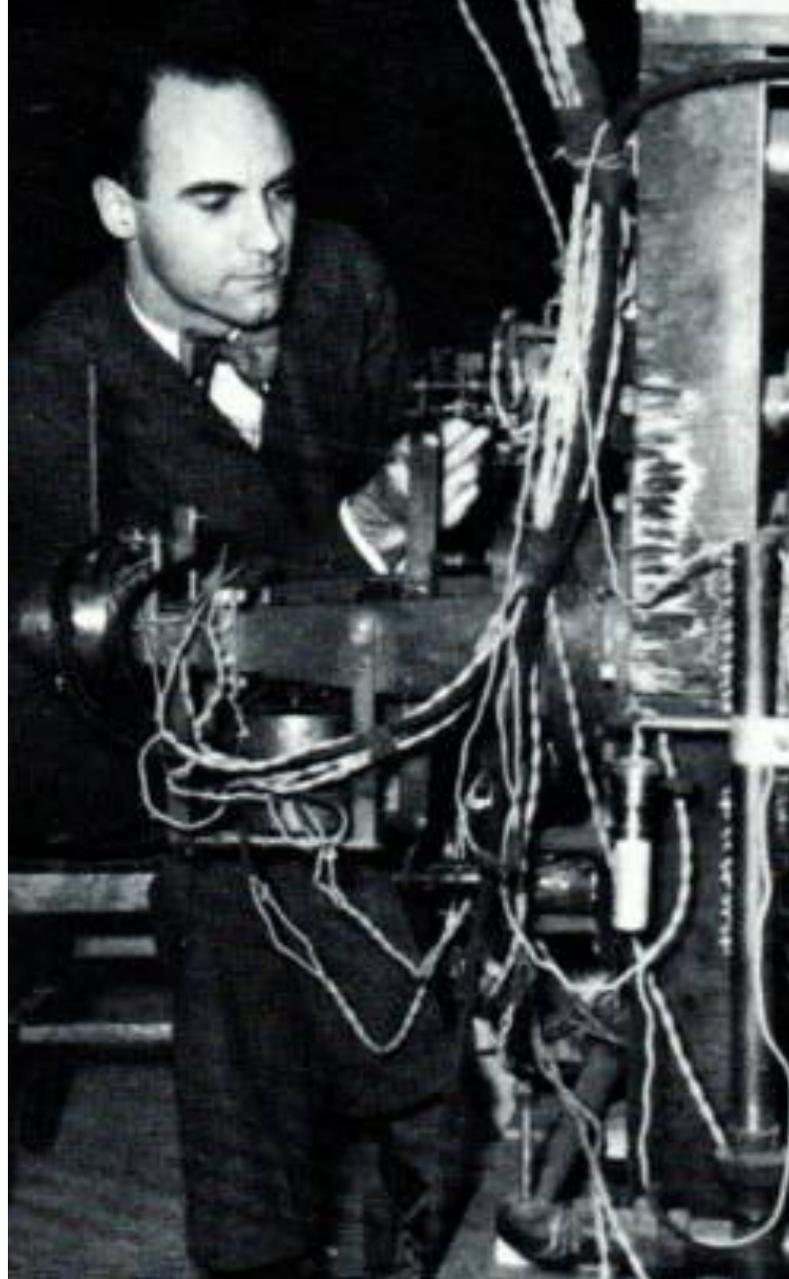
29 November 2012



$$V = \sum P^a V_{P^a}$$

$$V = V_0 - \sum V_{\gamma\Delta} \left\{ 1 - \frac{\sigma_{\Delta}}{2} \right\}$$





Dirac equation for fermions:

$$i\hbar\gamma^\mu\partial_\mu\psi - mc\psi = 0$$

Relativistic energy (from special relativity):

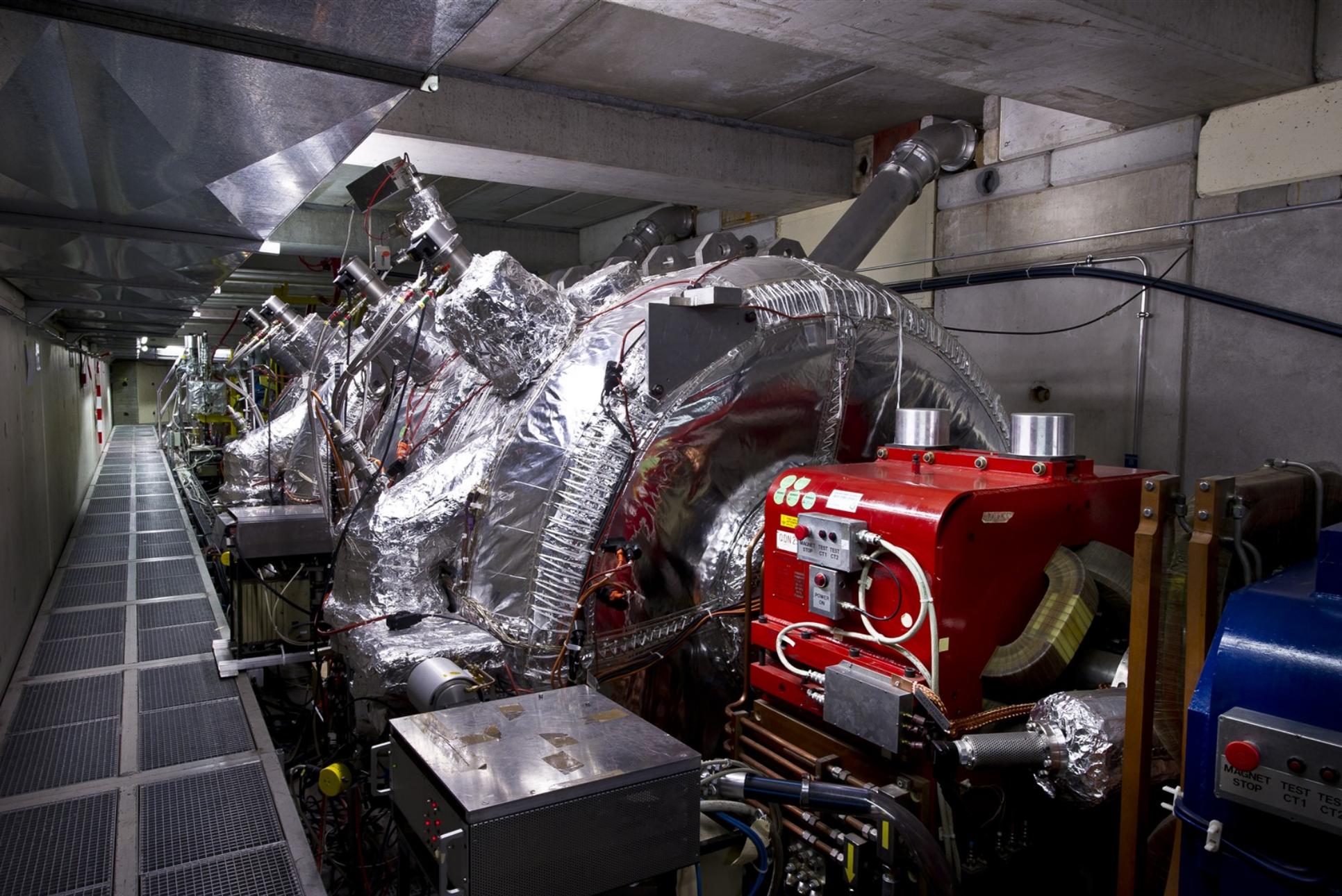
$$E^2 = p^2c^2 + m^2c^4$$

Dirac equation consistent with both positive and negative energy solutions:

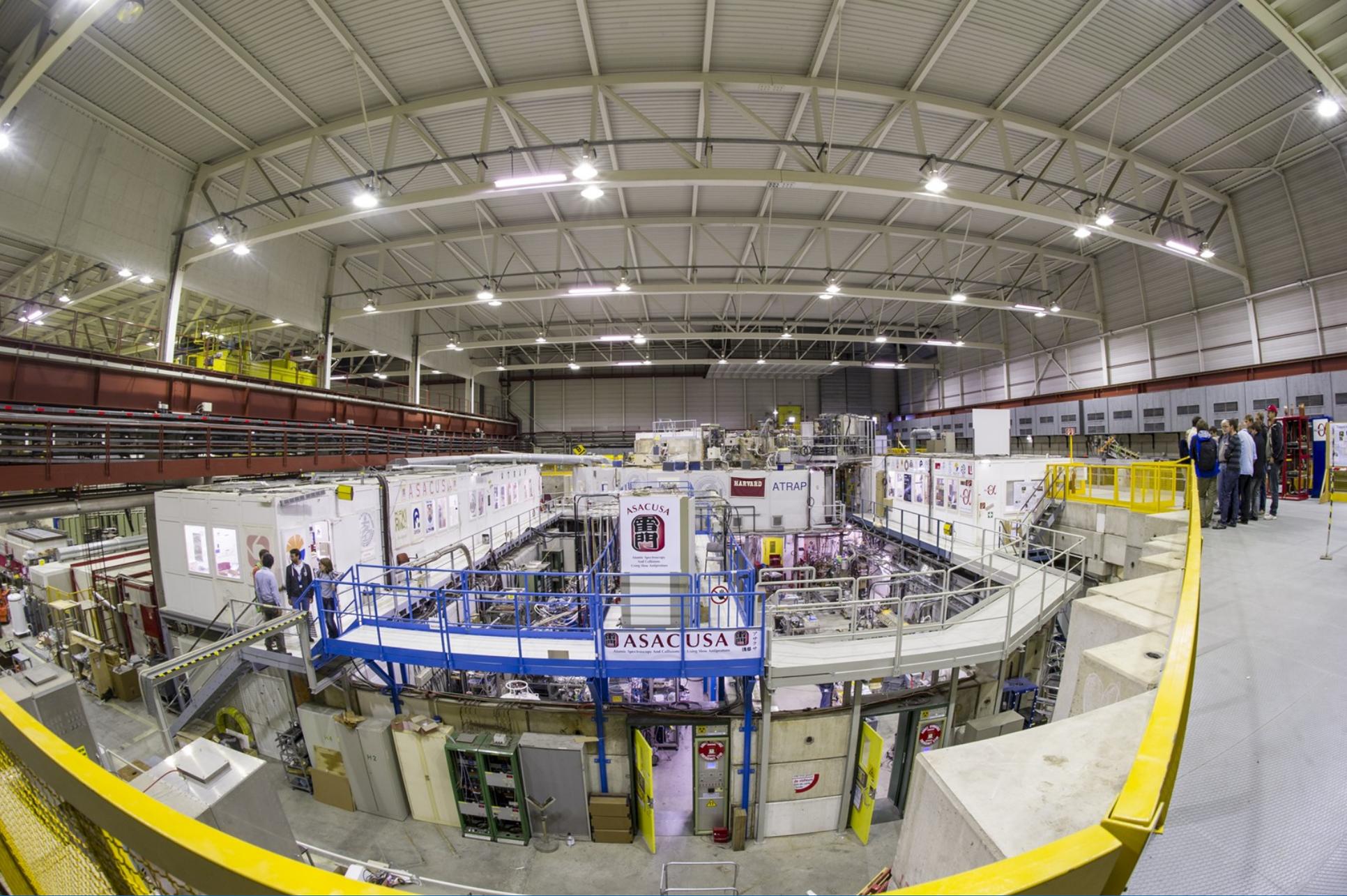
$$E = \pm\sqrt{p^2c^2 + m^2c^4}$$

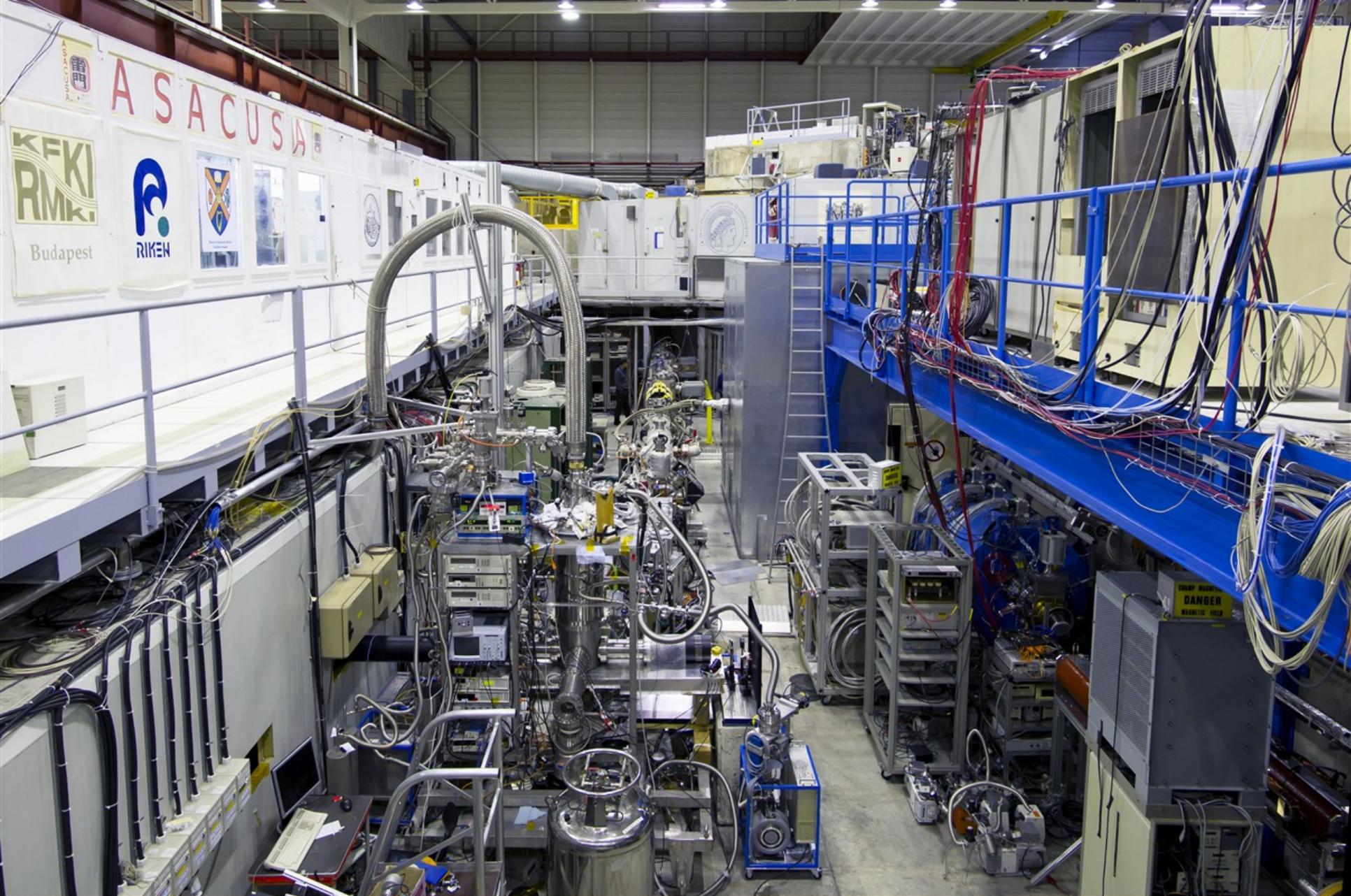
Negative energy solution associated with antiparticle



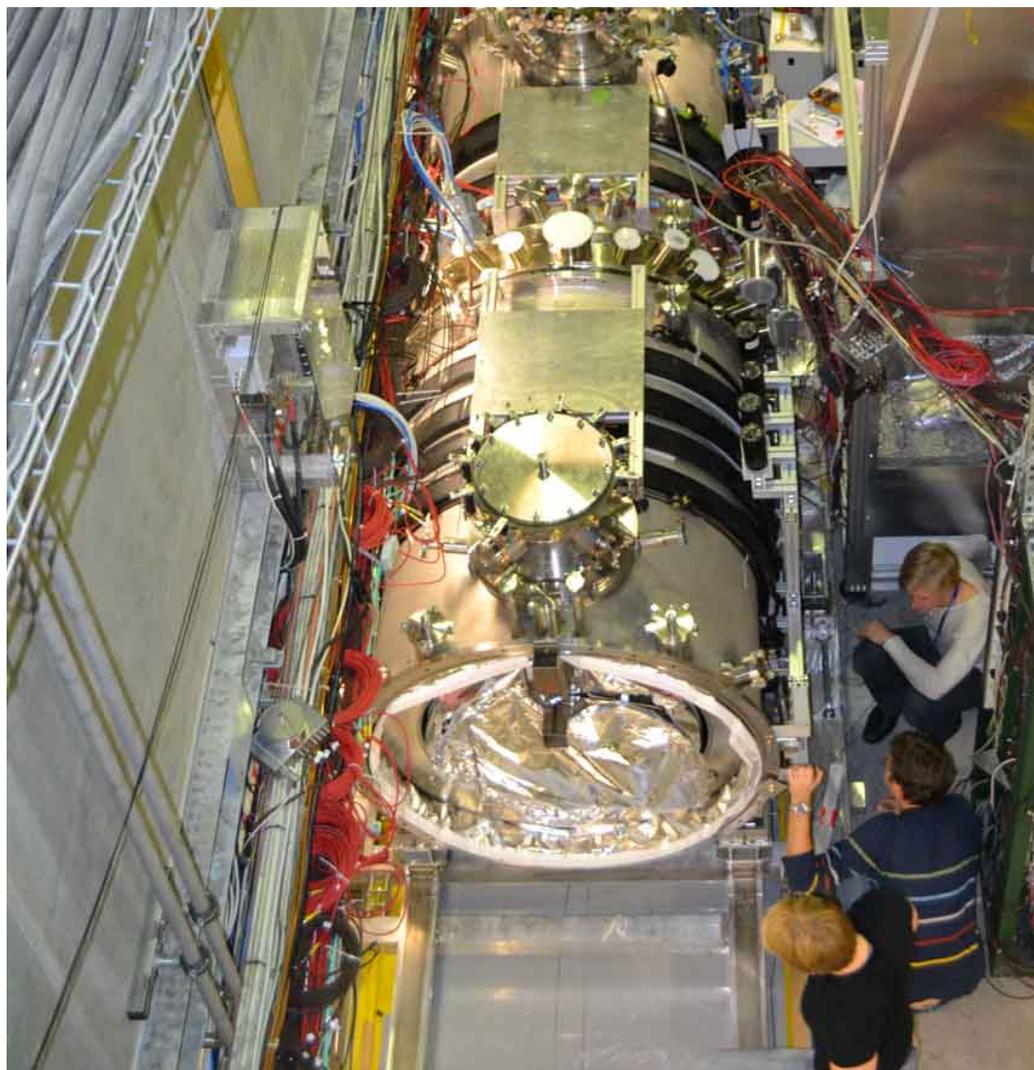
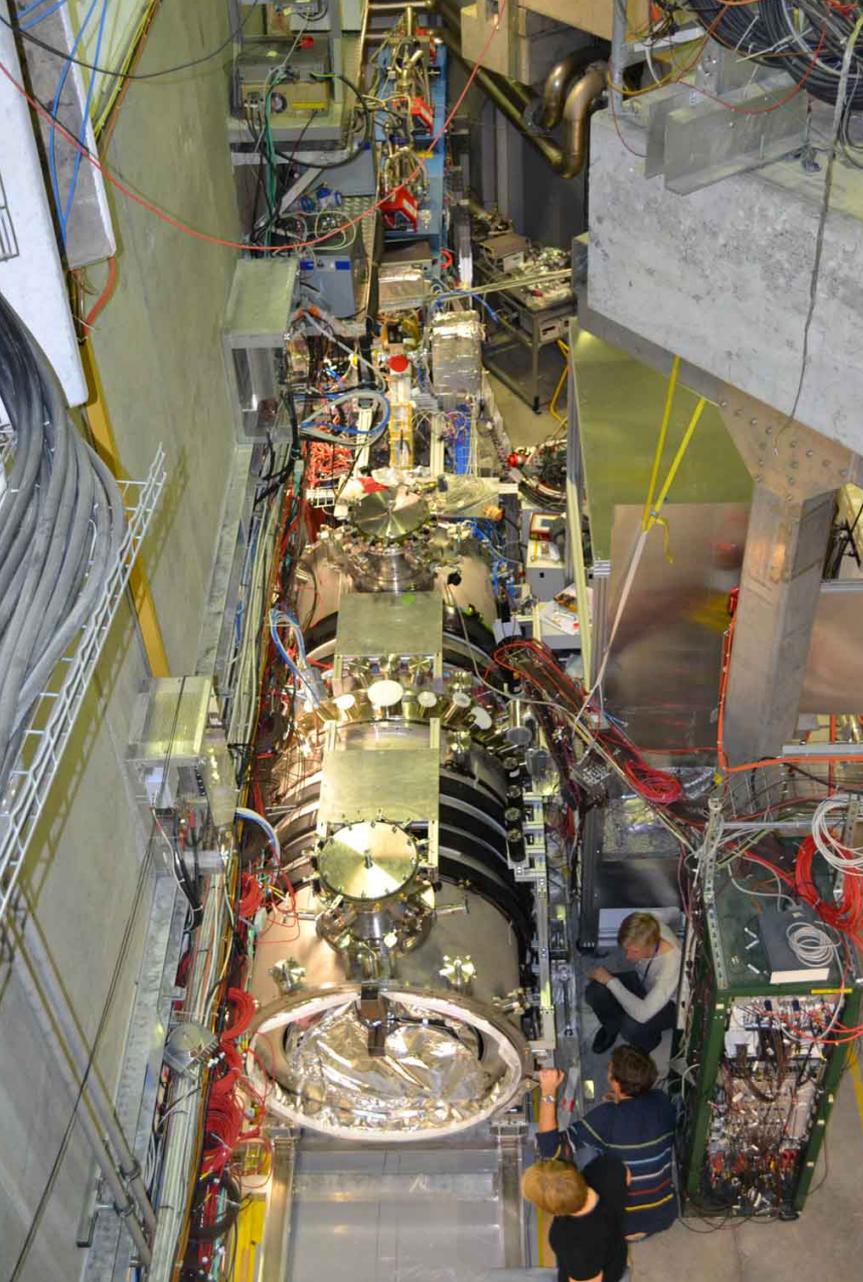


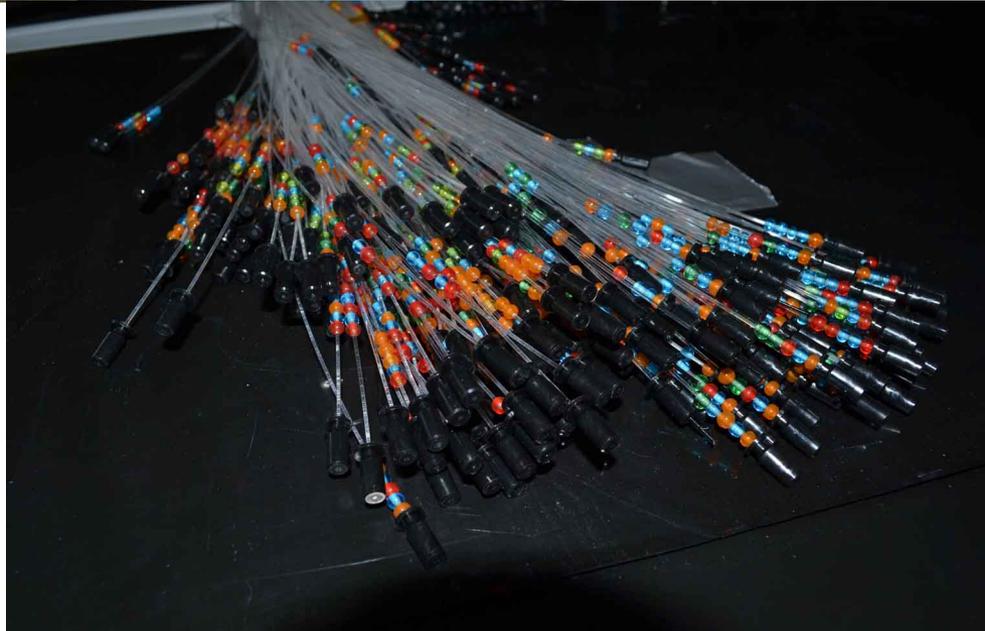
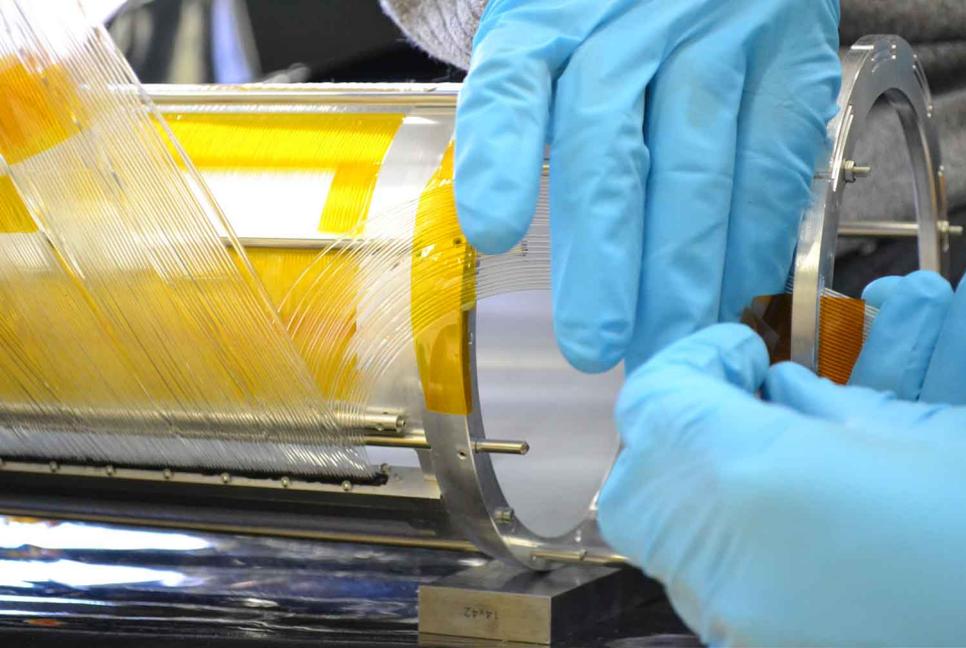


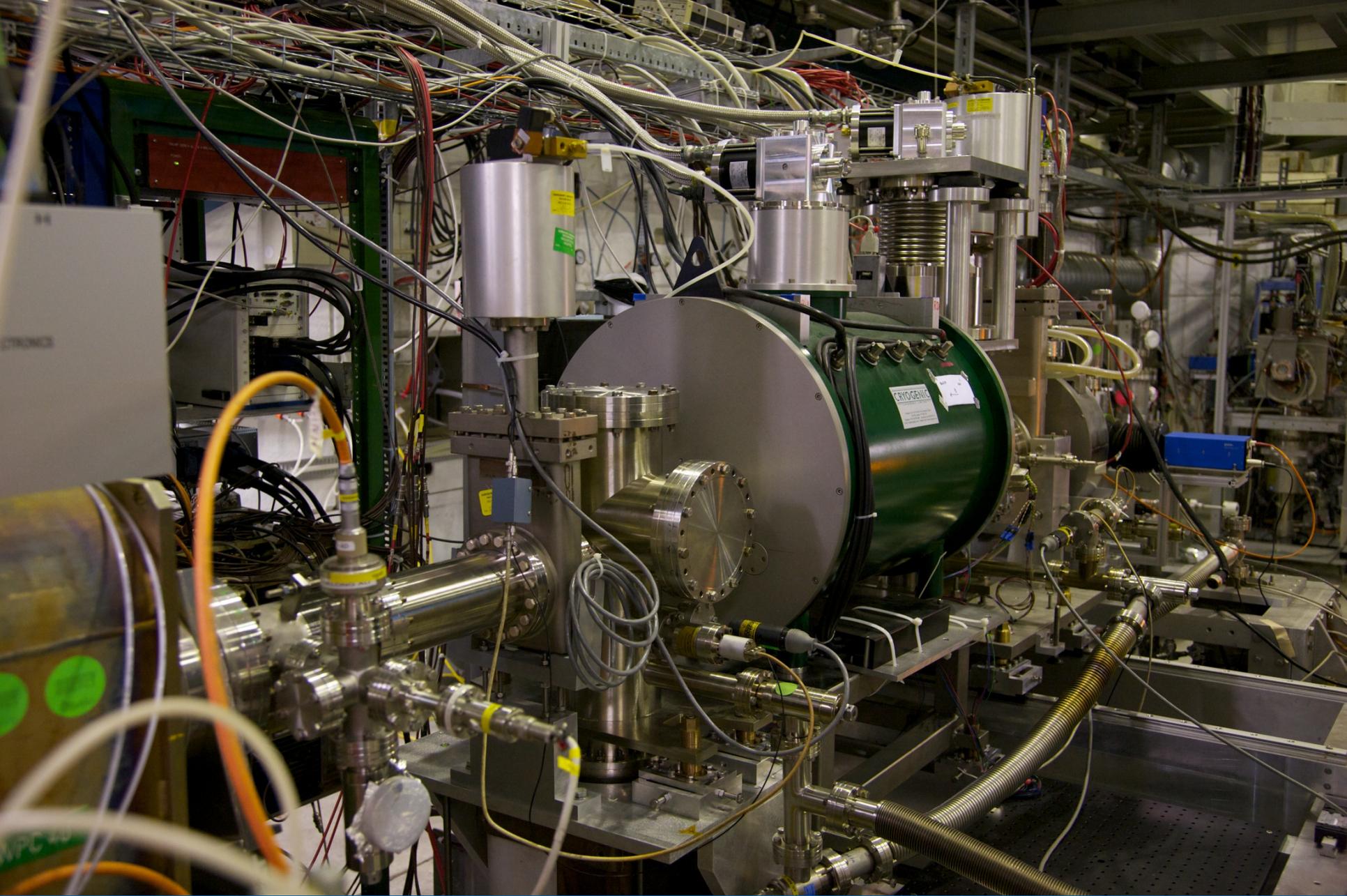


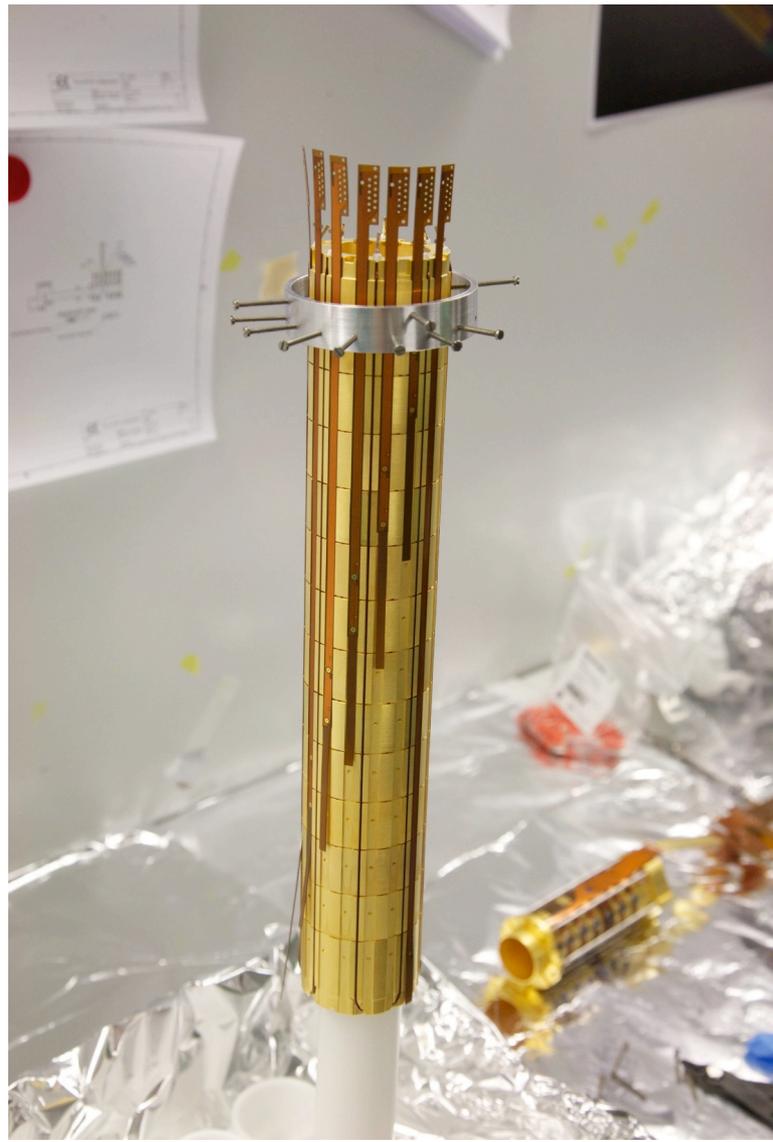
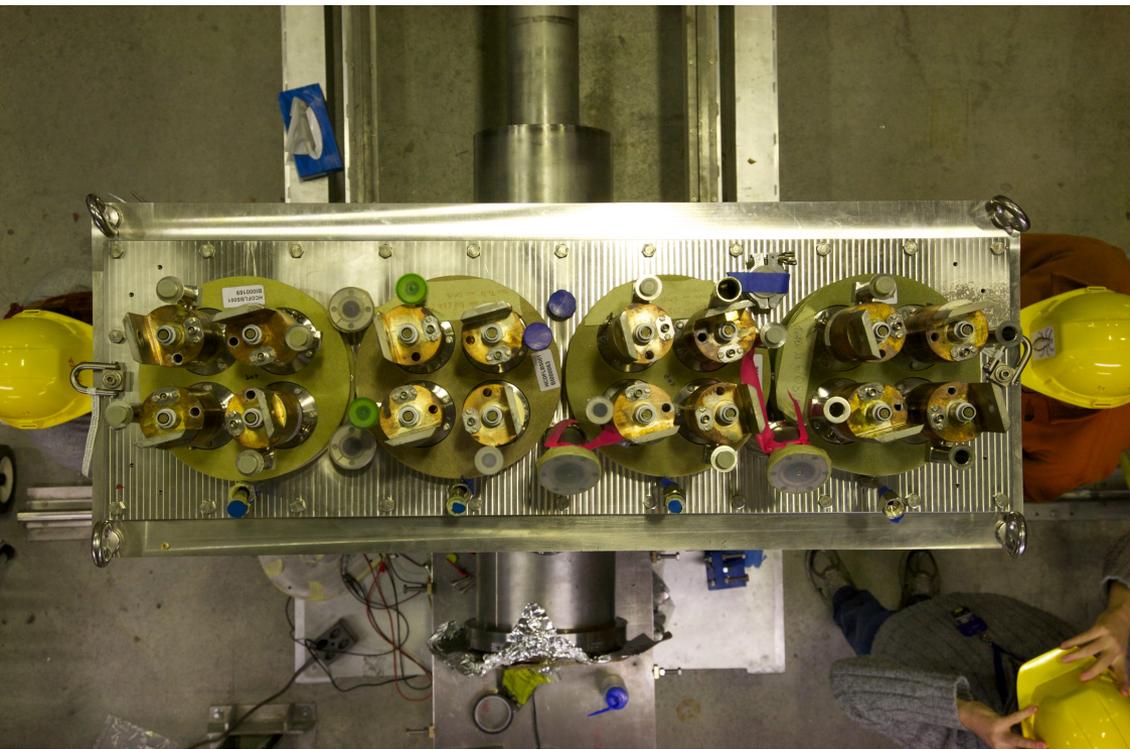


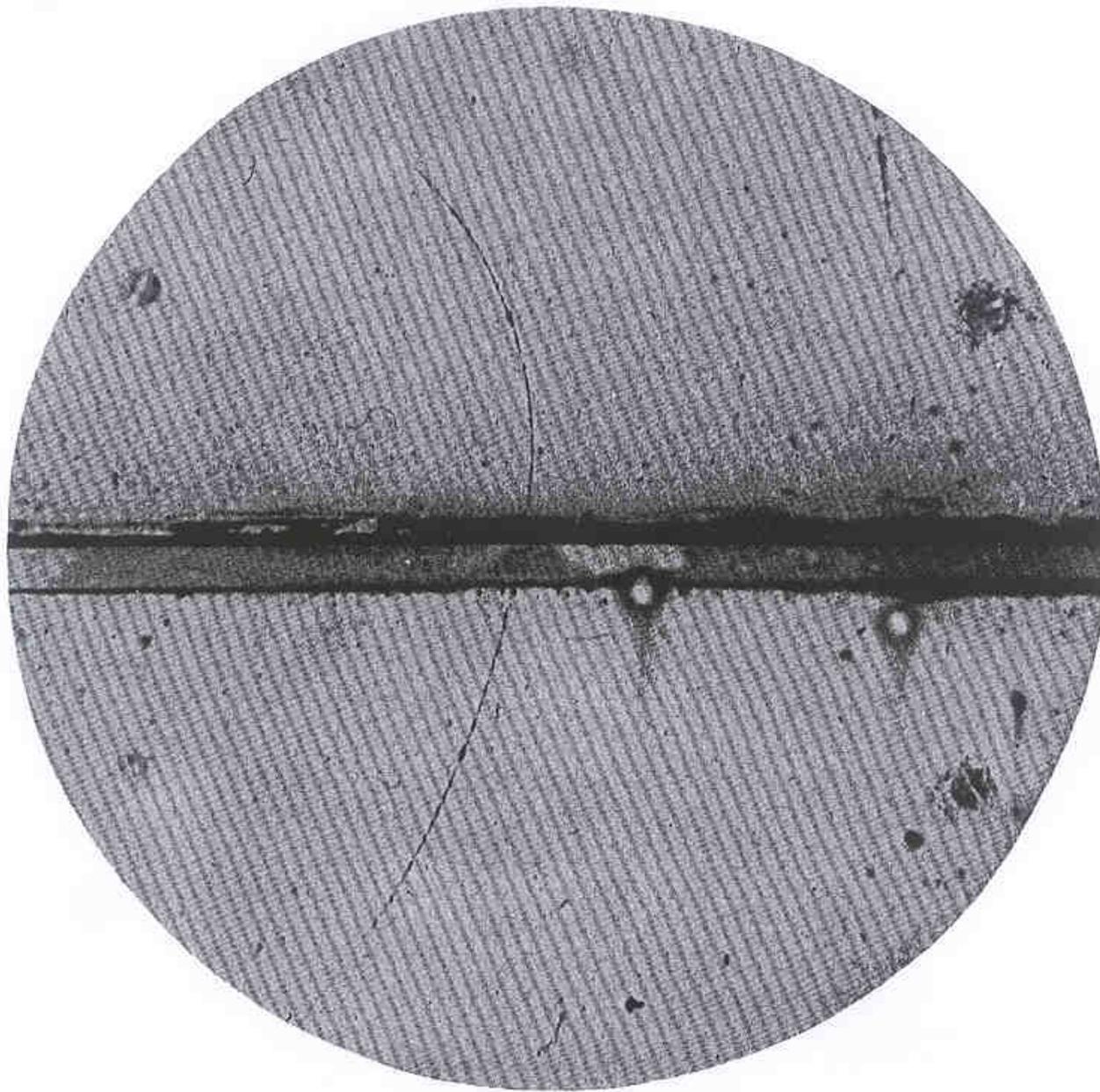














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