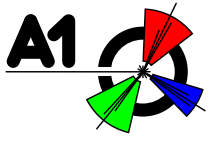
Cross Section Measurements of the Elastic Electron - Deuteron Scattering at MAMI

Yvonne Kohl
for the A1 Collaboration

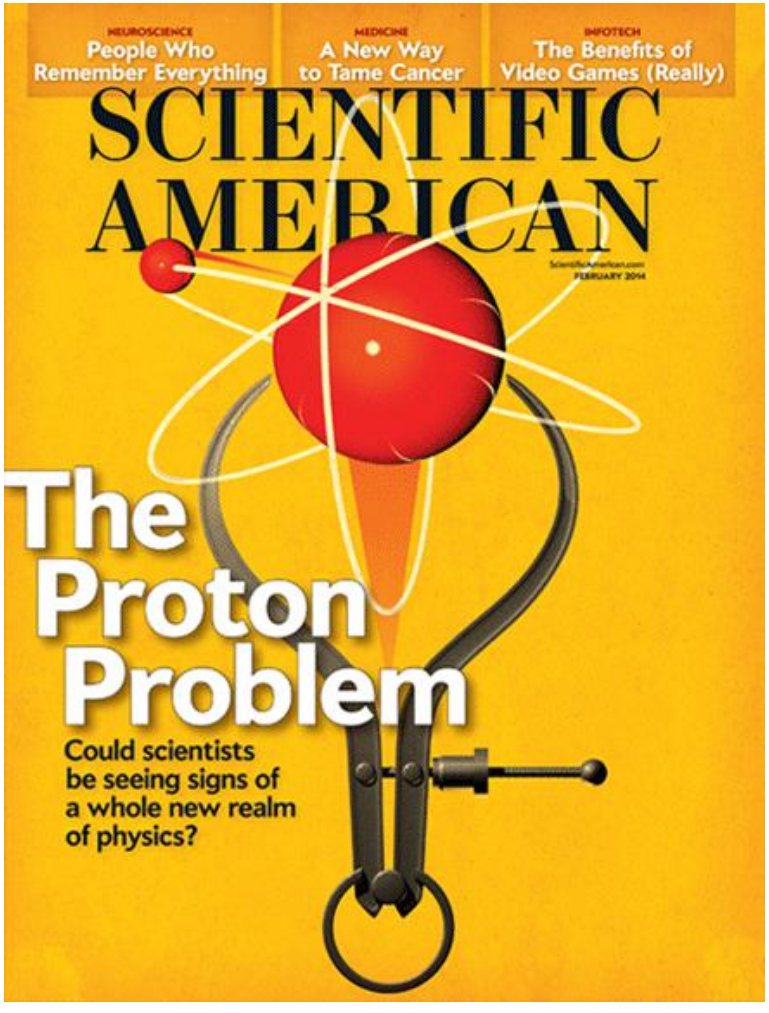
Institut für Kernphysik,
Johannes Gutenberg-Universität Mainz

53rd International Winter Meeting on Nuclear Physics
26-30 January 2015 Bormio (Italy)

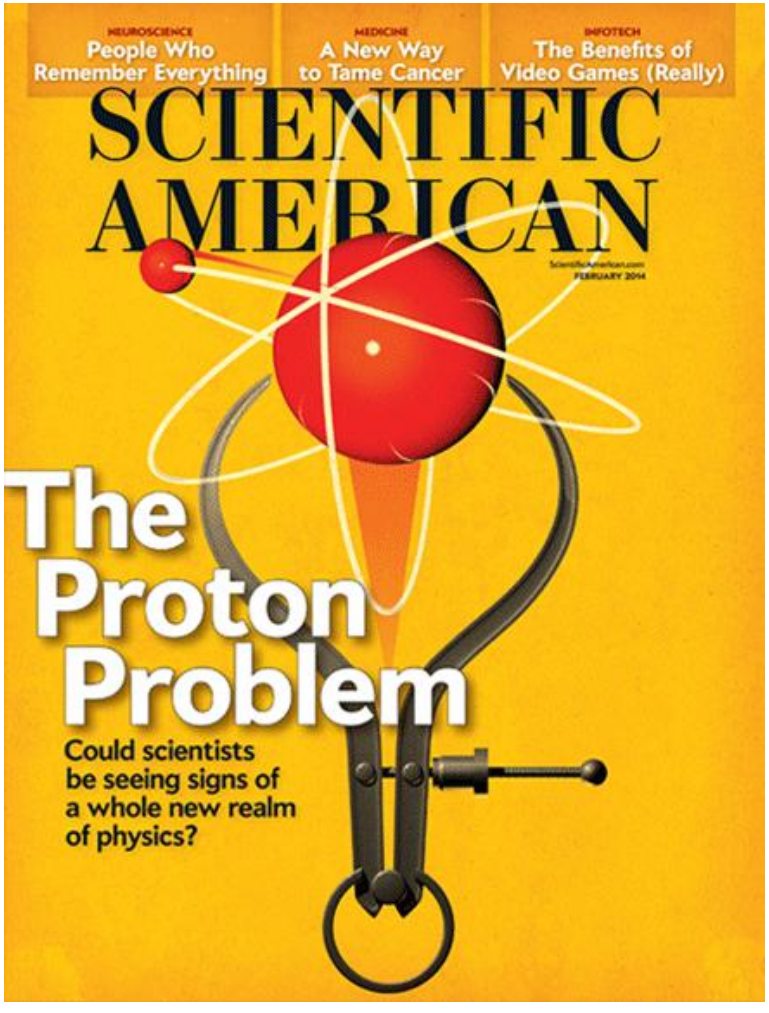


Proton Radius Puzzle

Proton Radius Puzzle



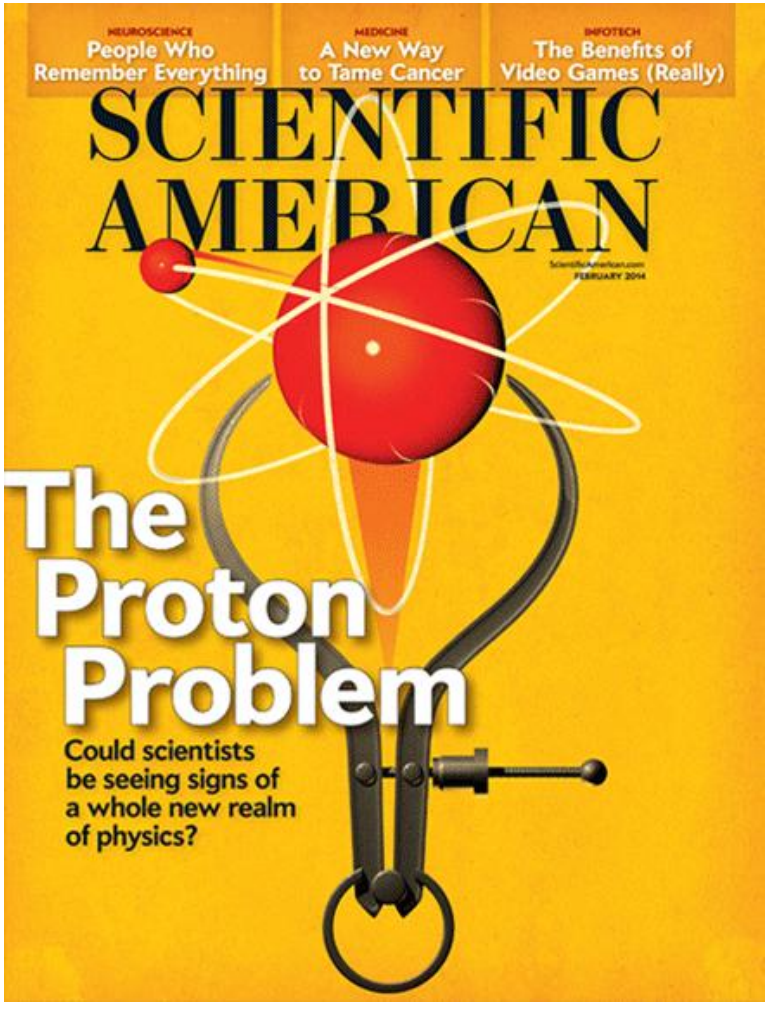
Proton Radius Puzzle



Different ways of measuring the radius:

1. Electron scattering
2. Lamb shift
3. Muonic hydrogen

Proton Radius Puzzle



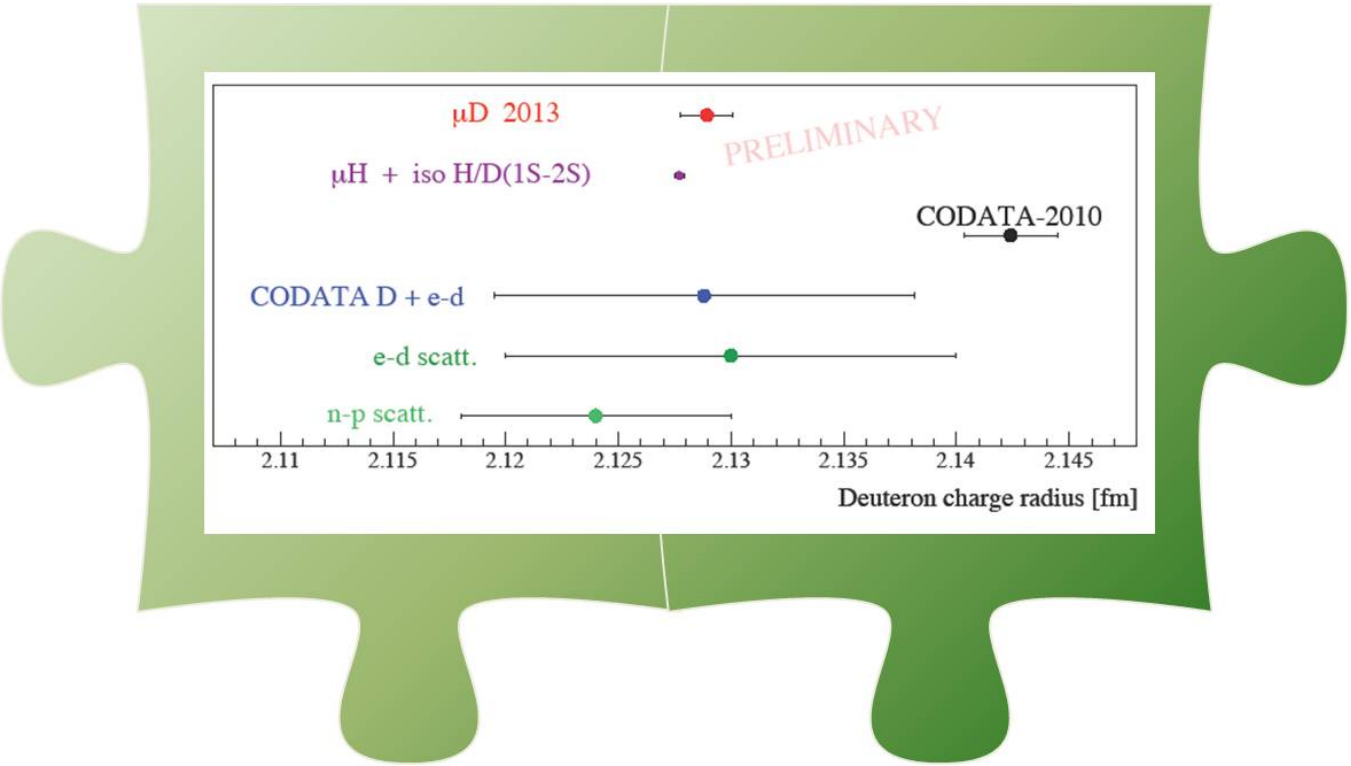
Different ways of measuring the radius:

1. Electron scattering
2. Lamb shift
3. Muonic hydrogen

Also different results:

- 1 & 2: $r_p = 0.8768(69)$ fm
- 3: $r_p = 0.84184(67)$ fm
  $\Rightarrow$Difference of over 5 standard deviations

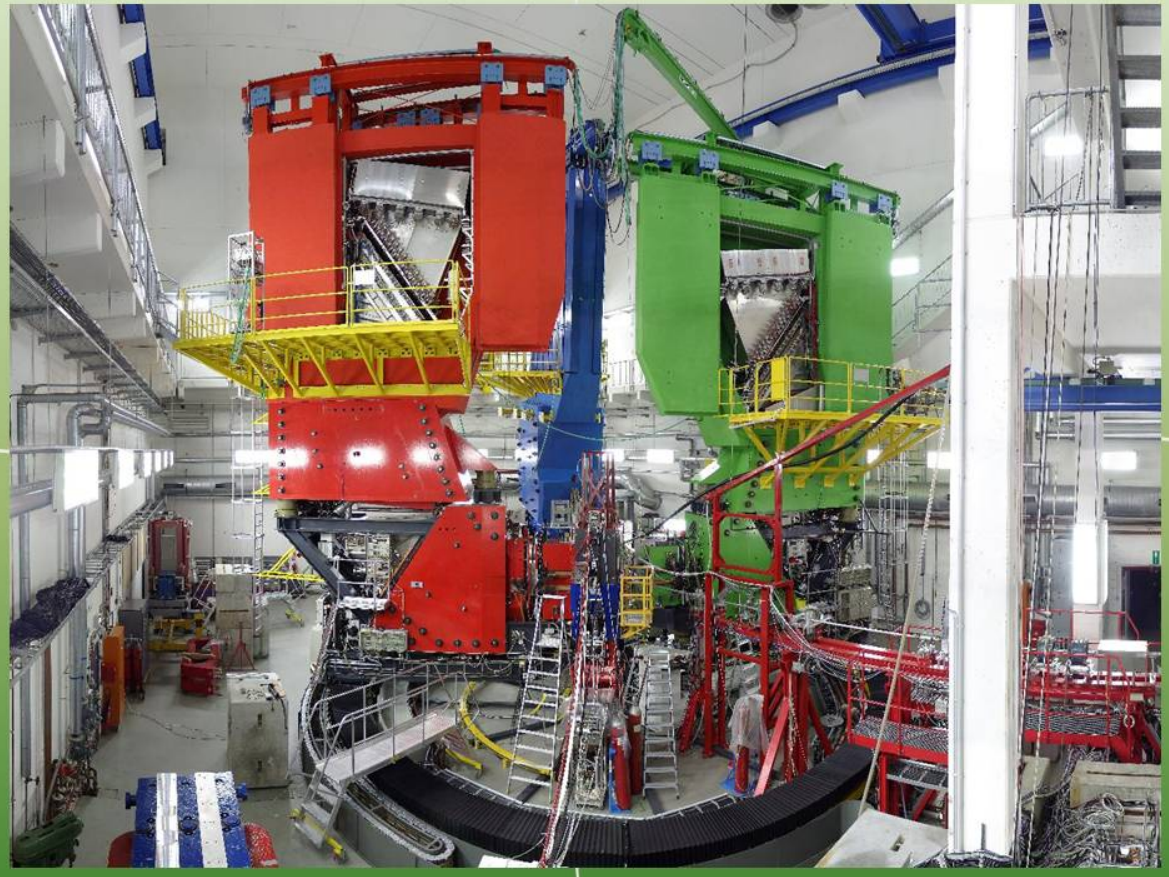
Why e^- - d scattering?



$r_d \Rightarrow r_p$

- Isotope shift between H and D $\Rightarrow r_d^2 - r_p^2$
- Still big errors on many r_d results
- More precise measurements necessary

Setup at A1



Setup at A1