

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

Yvonne Stöttinger  
for the A1 Collaboration

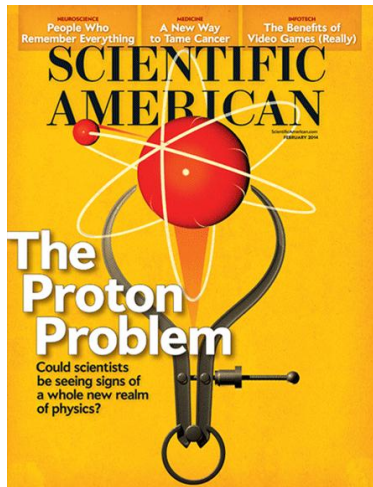
Institut für Kernphysik,  
Johannes Gutenberg-Universität Mainz

56th International Winter Meeting on Nuclear Physics  
22-26 January 2018 Bormio (Italy)

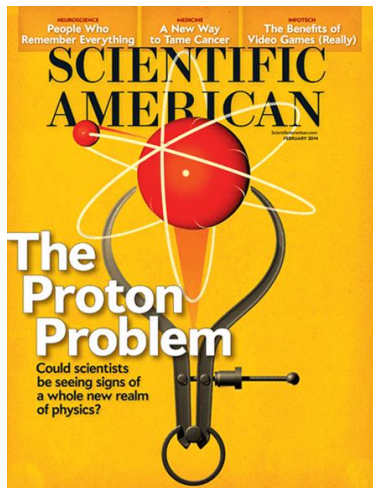


# Proton Radius Puzzle

# Proton Radius Puzzle



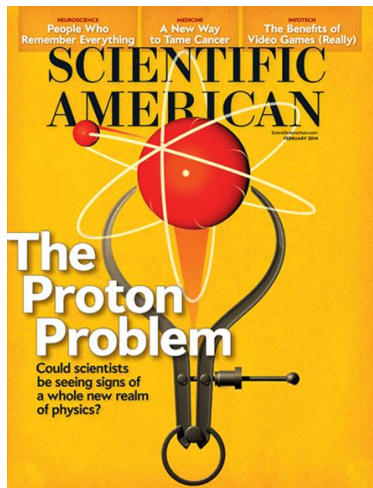
# Proton Radius Puzzle



## Different ways of measuring the radius:

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

# Proton Radius Puzzle



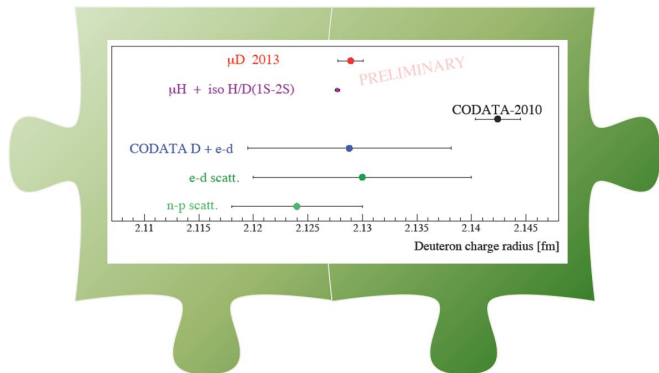
## Different ways of measuring the radius:

- 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  
⇒ Difference of over 5 standard deviations

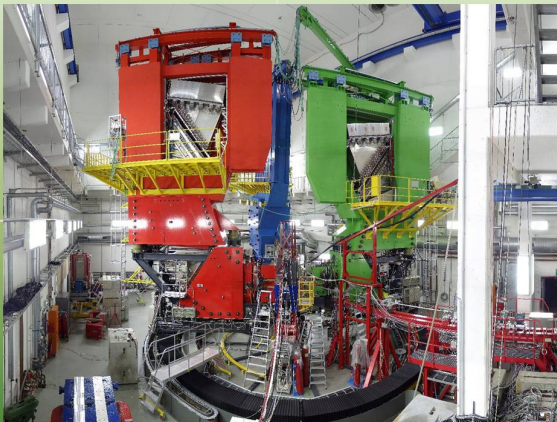
## Why $e^-$ - d scattering?



$$r_d \Rightarrow r_p$$

- 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

