

# Perspectives on SFB ANL/MSU program



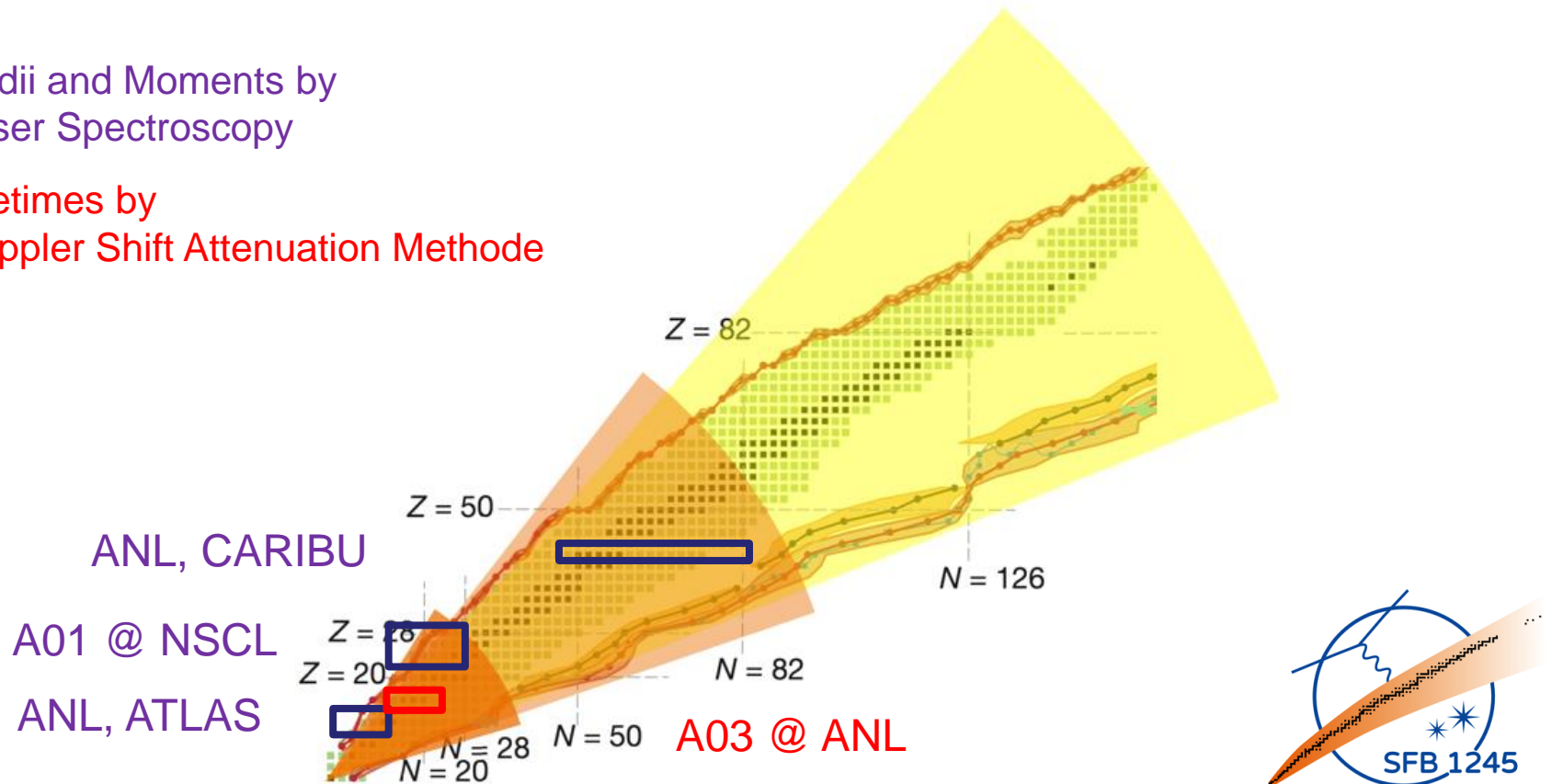
TECHNISCHE  
UNIVERSITÄT  
DARMSTADT



## Electromagnetic properties of light and medium mass nuclei

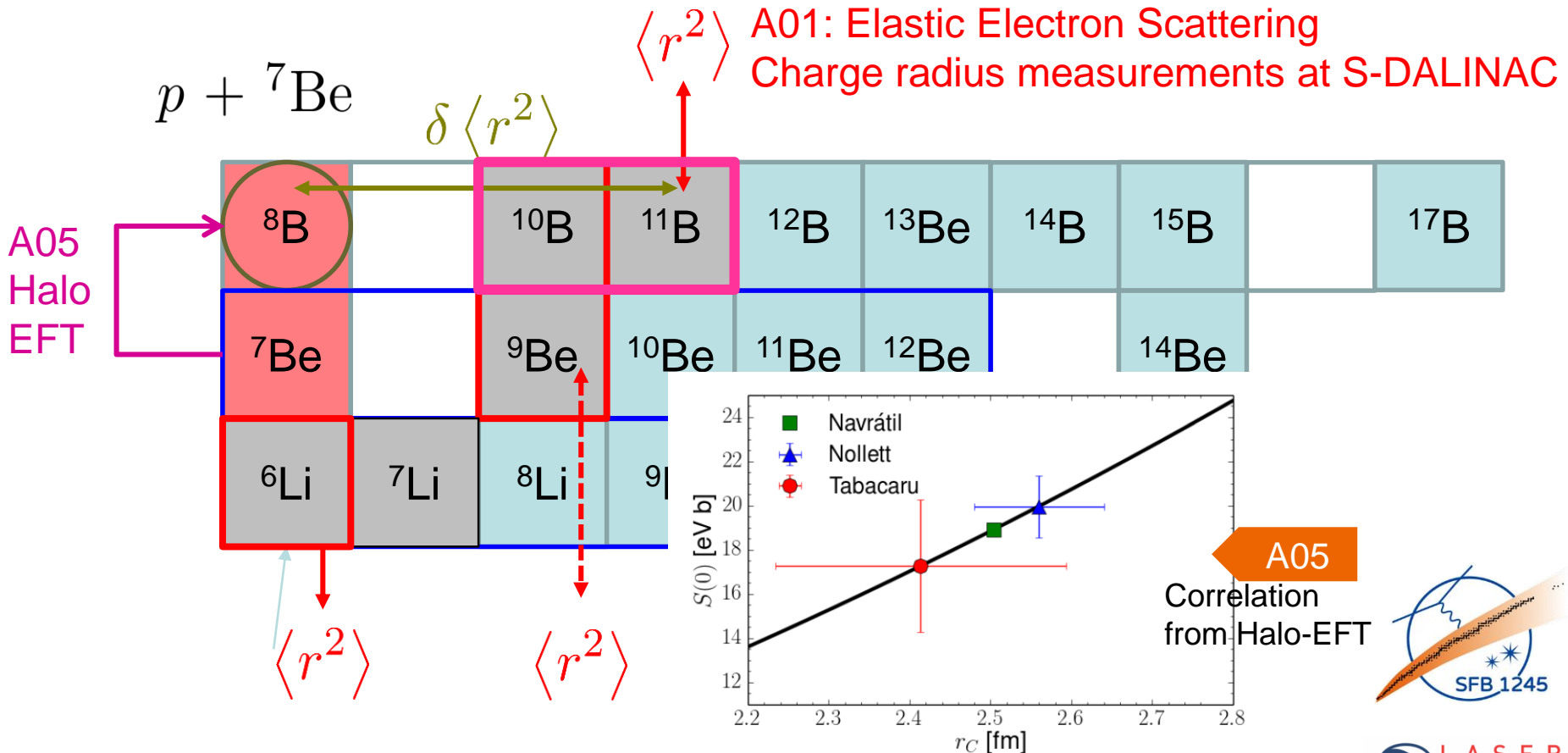
Radii and Moments by  
Laser Spectroscopy

Lifetimes by  
Doppler Shift Attenuation Methode



# A01 @ ANL: Charge Radius of $^{11}\text{B}$

Charge Radii of  $^{8,10,11}\text{B}$  from NCSM (A02)  $\rightarrow$  benchmark



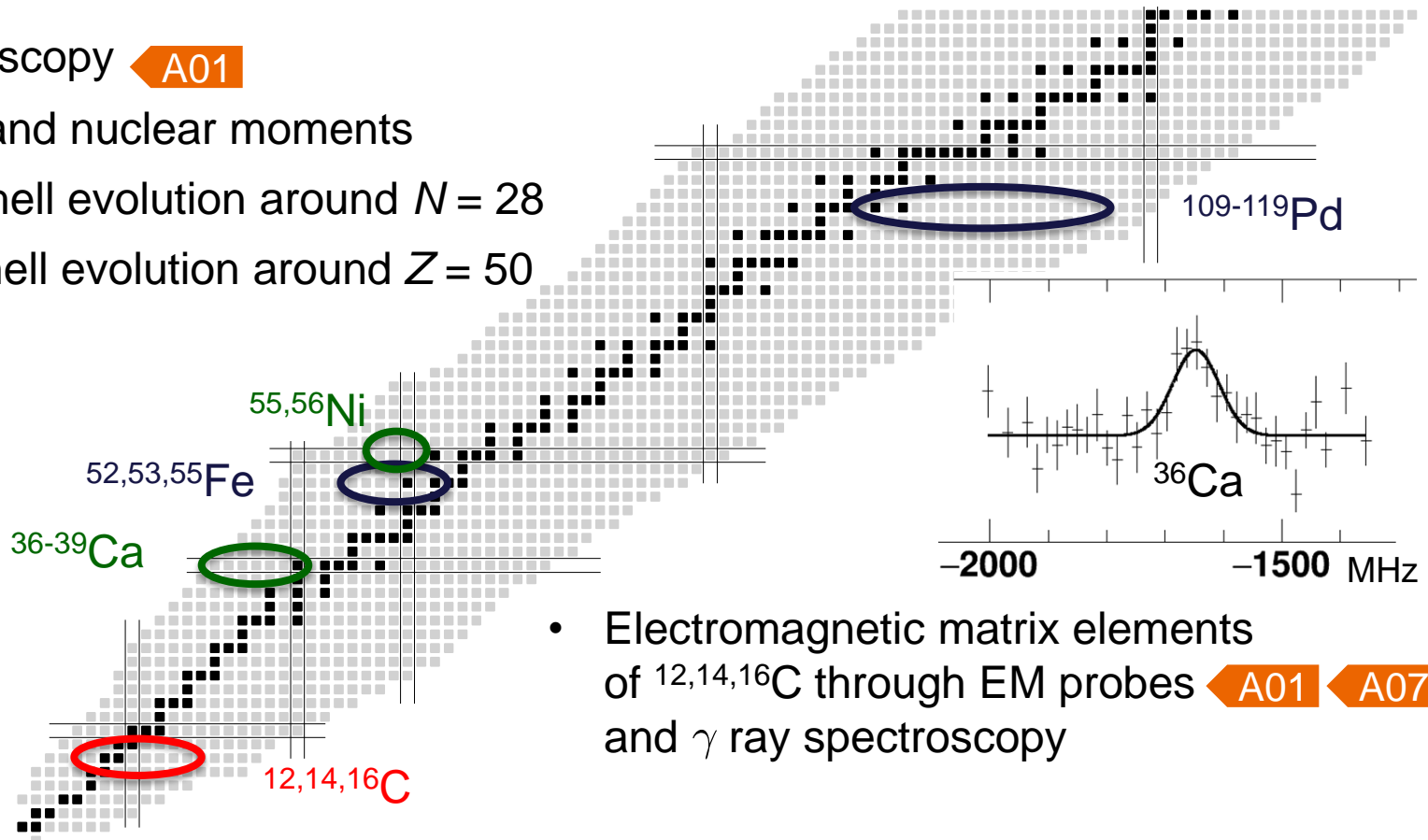


Key experiments on electromagnetic observables A02 A04

Laser spectroscopy A01

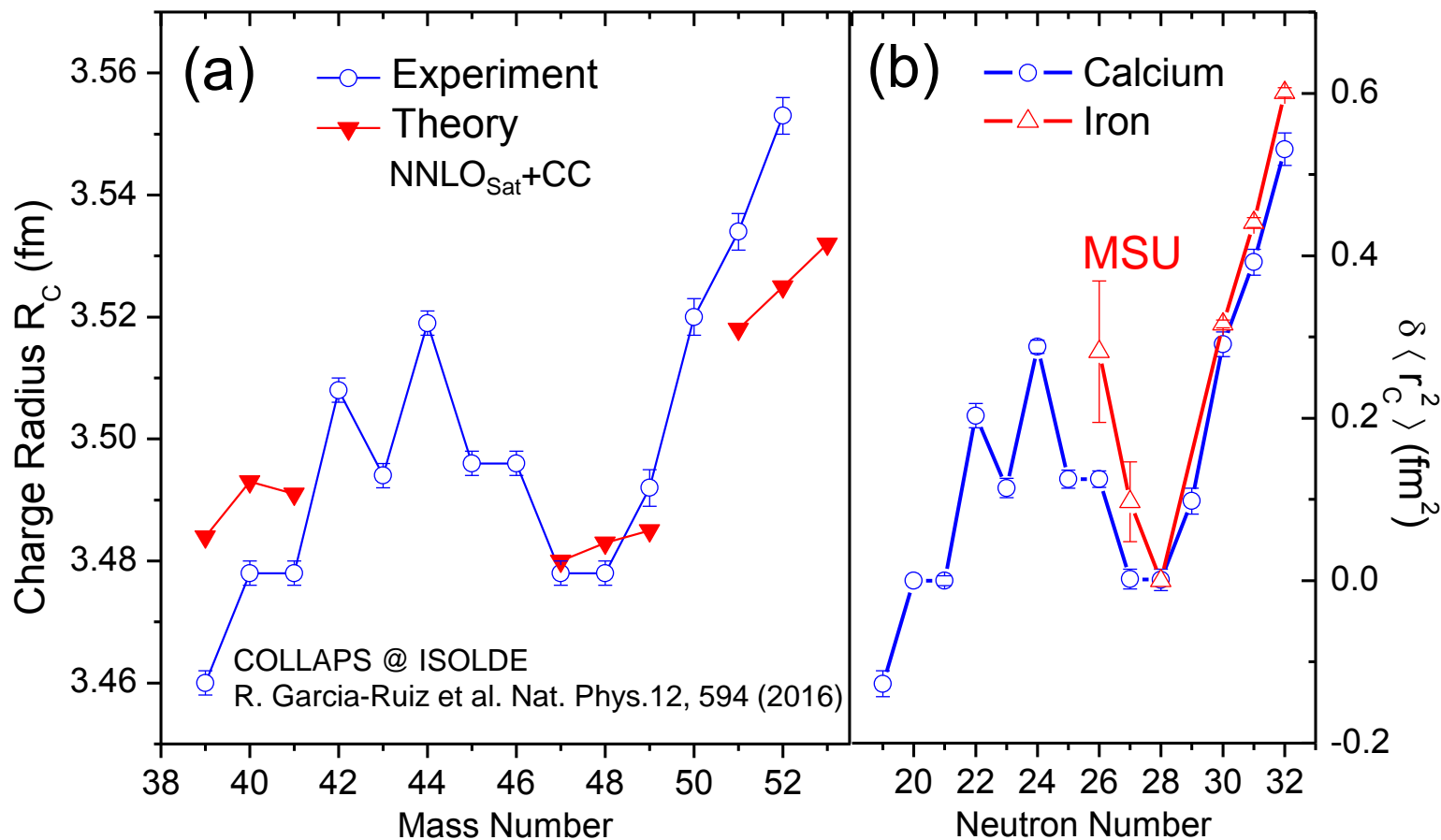
Charge radii and nuclear moments

- $^{52,53,55}\text{Fe}$  shell evolution around  $N = 28$
- $^{109-119}\text{Pd}$  shell evolution around  $Z = 50$



- Electromagnetic matrix elements of  $^{12,14,16}\text{C}$  through EM probes A01 A07 and  $\gamma$  ray spectroscopy

# Ca-Ni Region @ NSCL

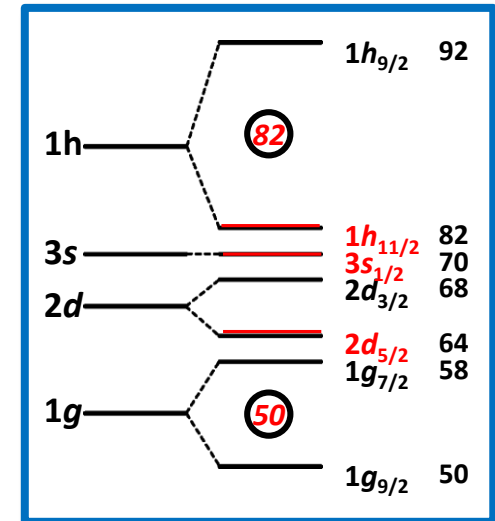
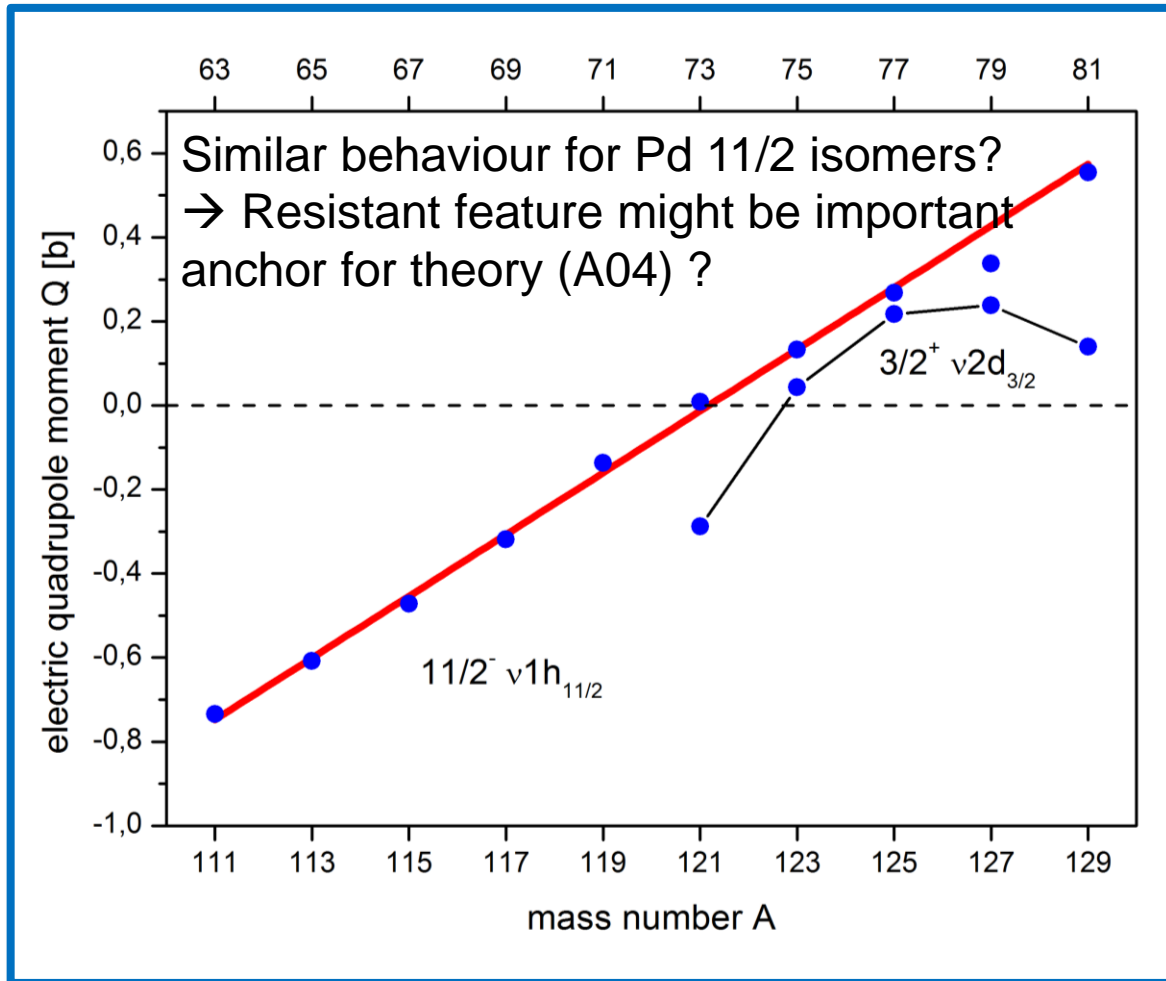


Minamisono et al., Phys. Rev. Lett. **117**, 252501 (2016)

Charge Radii of Neutron Deficient  $^{52,53}\text{Fe}$  Produced by Projectile Fragmentation



# A03 @ ANL / CARIBU: Electromagnetic Moments of Pd Isotopes (Z=46)



Capacity of  $1h_{11/2}$  niveau:  
12 neutrons  
→ 6 quad. moments  
But: 10 quad. moments

Neutron pairs shared  
between the neighboring  
levels.

# Outlook

## BECOLA



Calcium Region

Scandium  $Z=21$ ,  $N < 20$ , application

Long term :  $^{56}\text{Ca}$



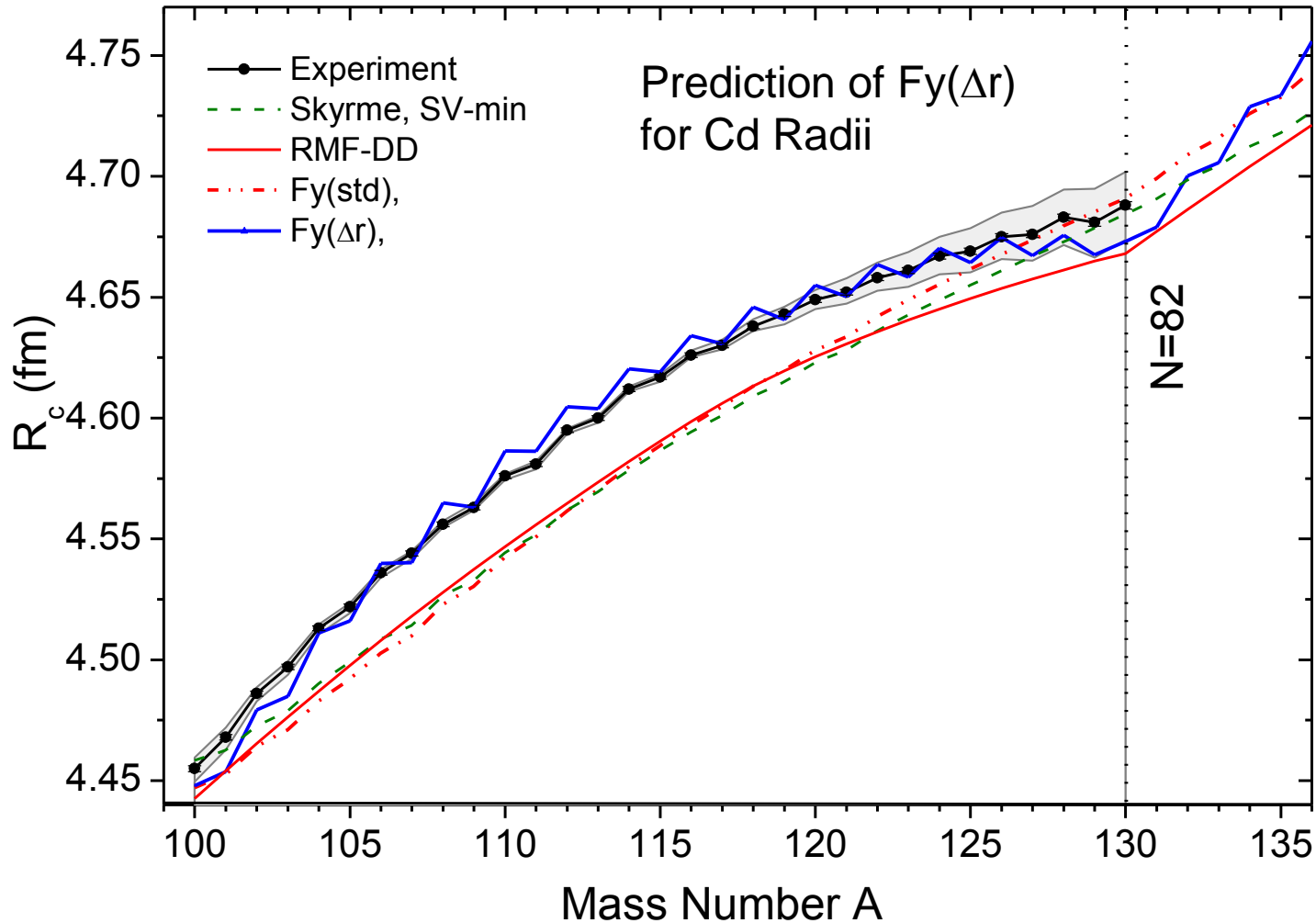
CARIBU „Cocktail“



All optical absolute charge radii of (Li),Be,B,C,(N)

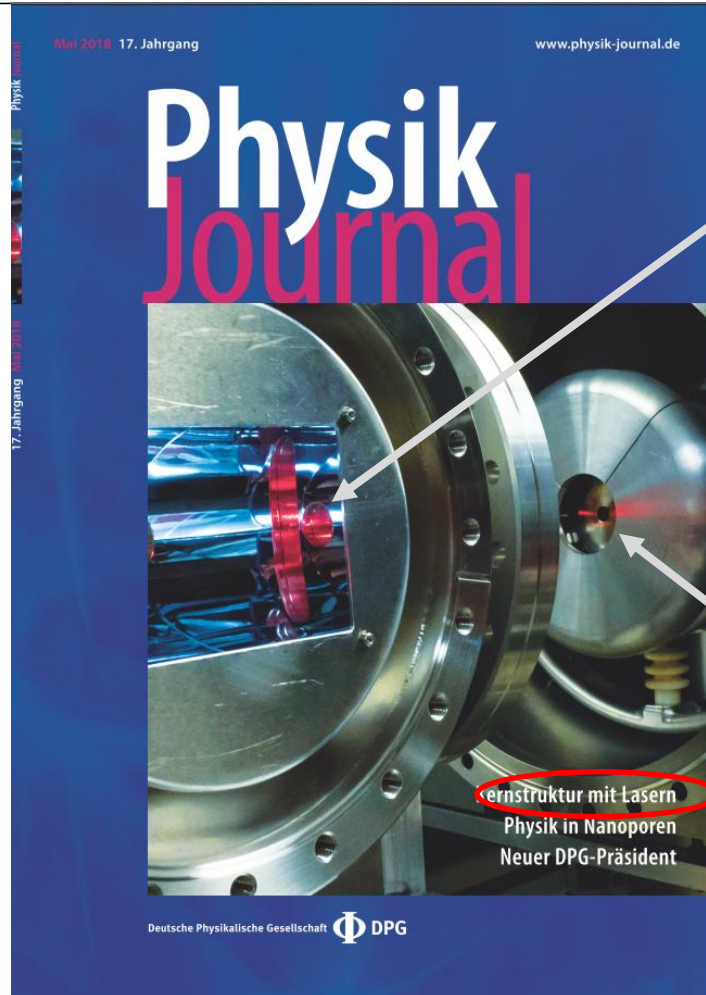


# Charge radii along the Cd Chain



# Recent Article ...

Outlook for CRC:  
Sc at MSU  
Absolute charge radii  
@ KOALA (TU  
Darmstadt)



Optical Detection Region  
Bernhard Maas



Charge Exchange Cell  
Felix Sommer

Photo by B. Maas & F. Sommer