

# **Probing the stability of superheavy nuclei**

Searching for the clouds of stability above the sea of instability

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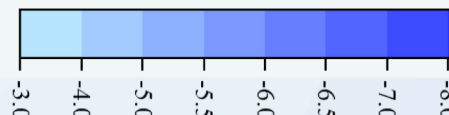
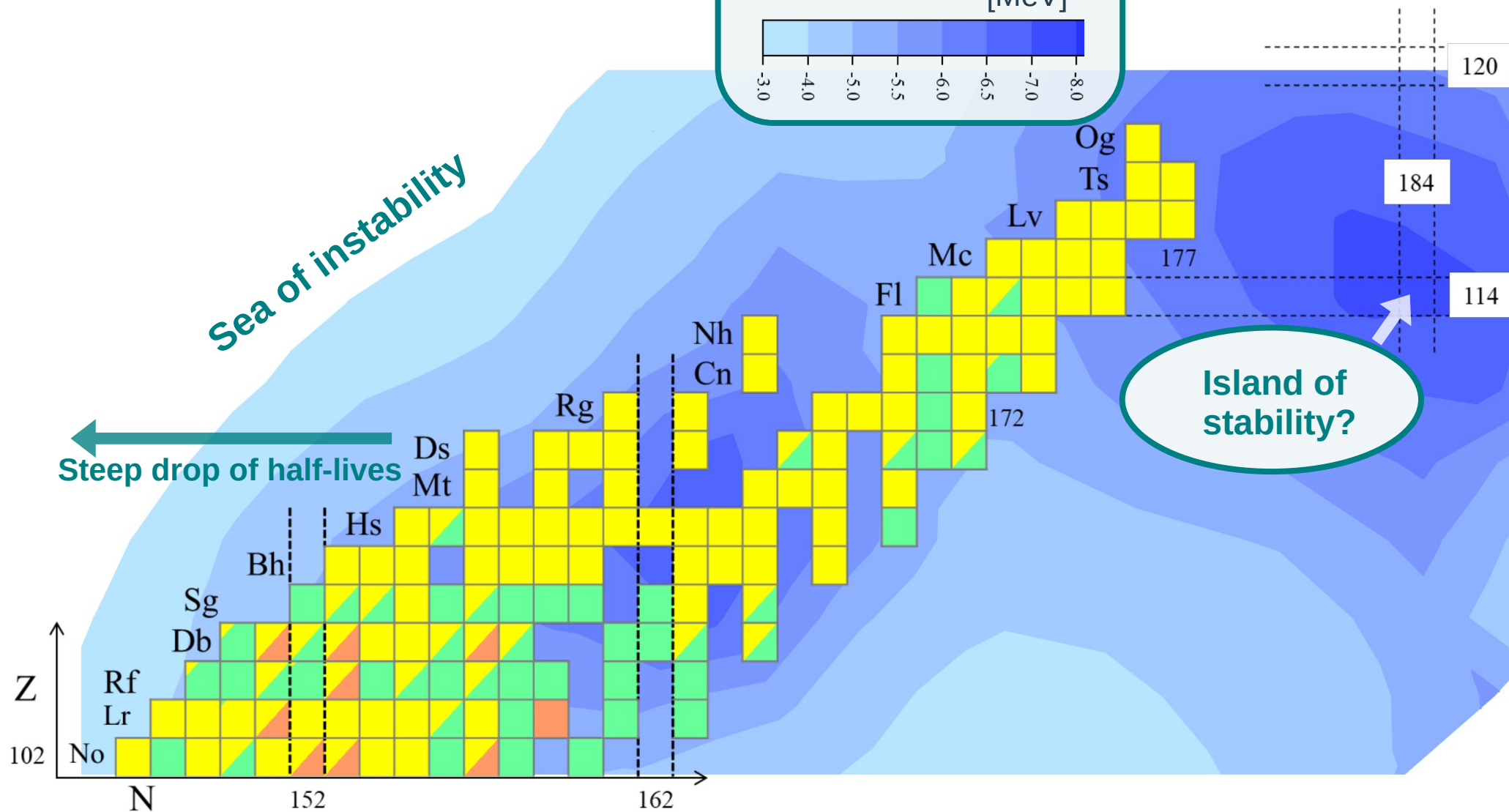
*GSI, 19 – 20 Oct, 2026*

## Superheavy nuclei

104 or more protons

Exist thanks to quantum shell effects

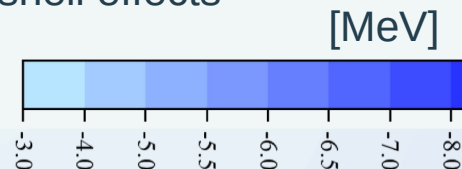
[MeV]



## Superheavy nuclei

104 or more protons

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## Experiments

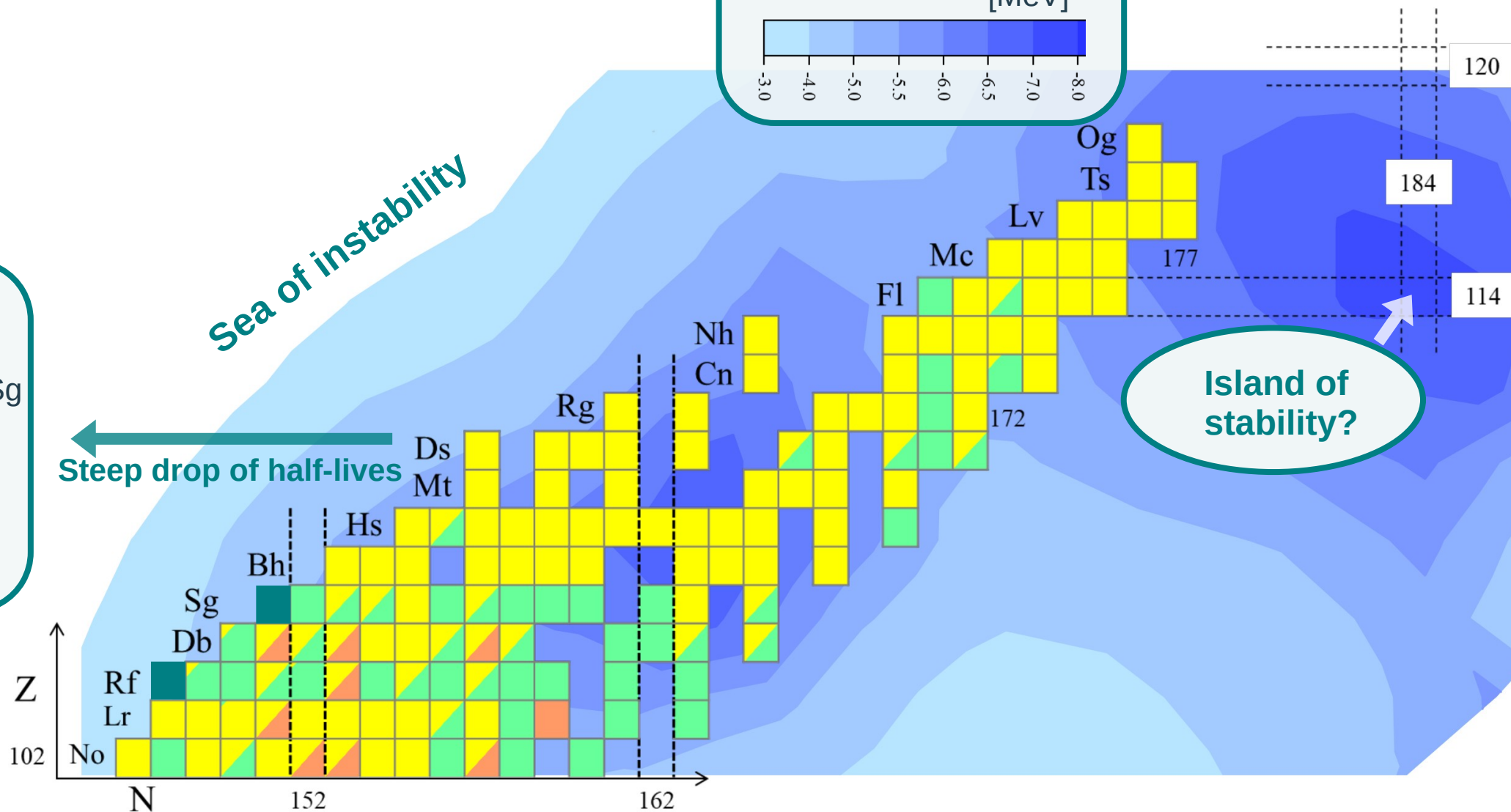
- **New isotopes** Rf, Sg - short-lived

Exp. Limit  $\approx 1 \mu\text{s}$

How to move below the limit?

Sea of instability

Steep drop of half-lives



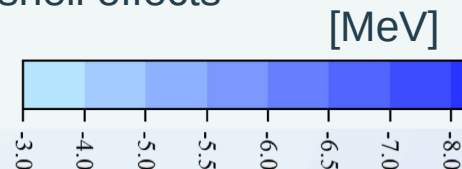
## Clouds of stability?

The ground state may not survive – a **K isomer** can!

## Superheavy nuclei

104 or more protons

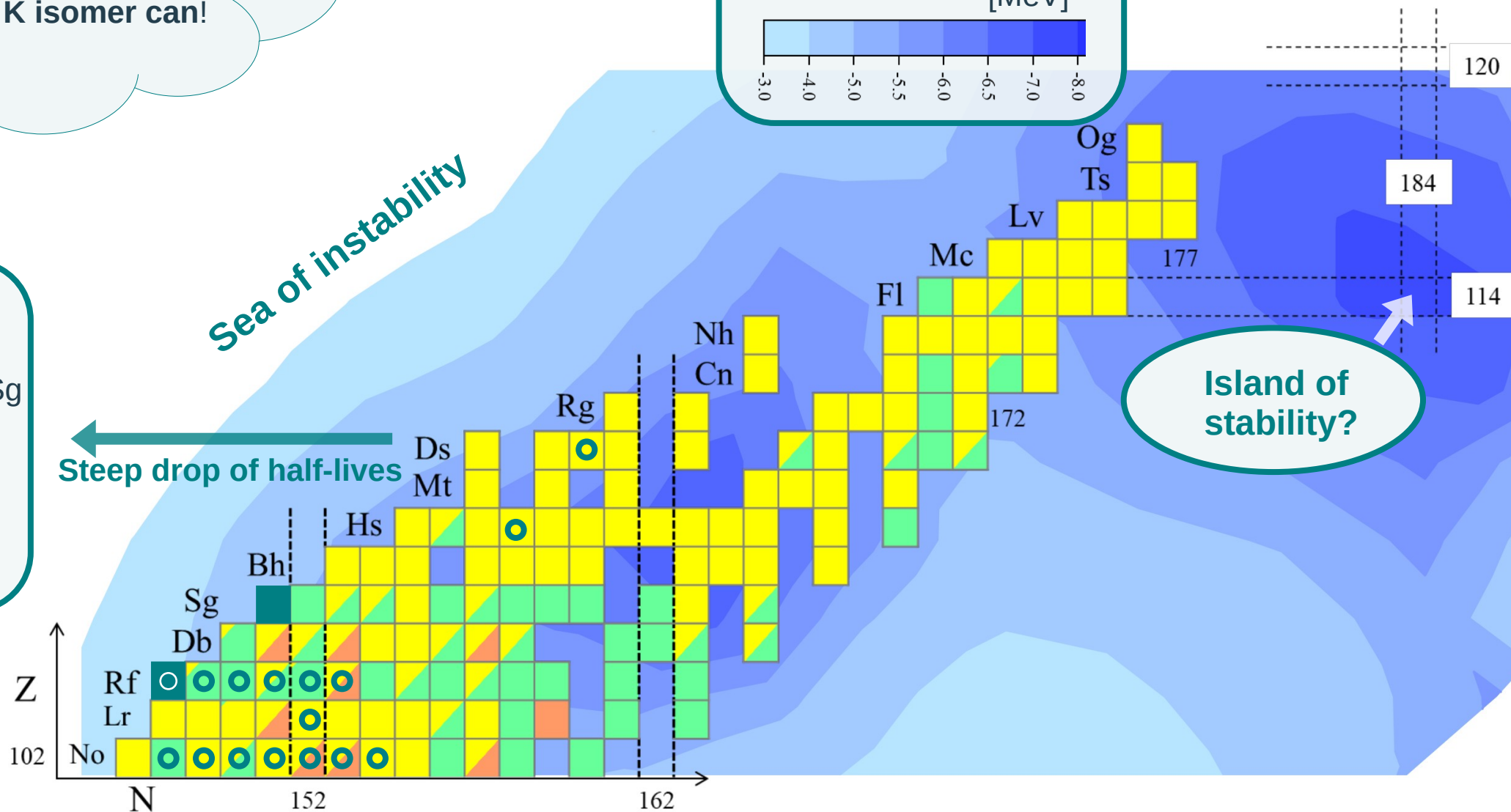
Exist thanks to quantum shell effects



## Experiments

- **New isotopes** Rf, Sg - short-lived  
Exp. Limit  $\approx 1 \mu\text{s}$
- **K isomerism**

How to move below the limit?



# Discovery of new isotopes

# Clouds of stability confirmed in <sup>252</sup>Rf

<sup>252</sup>Rf

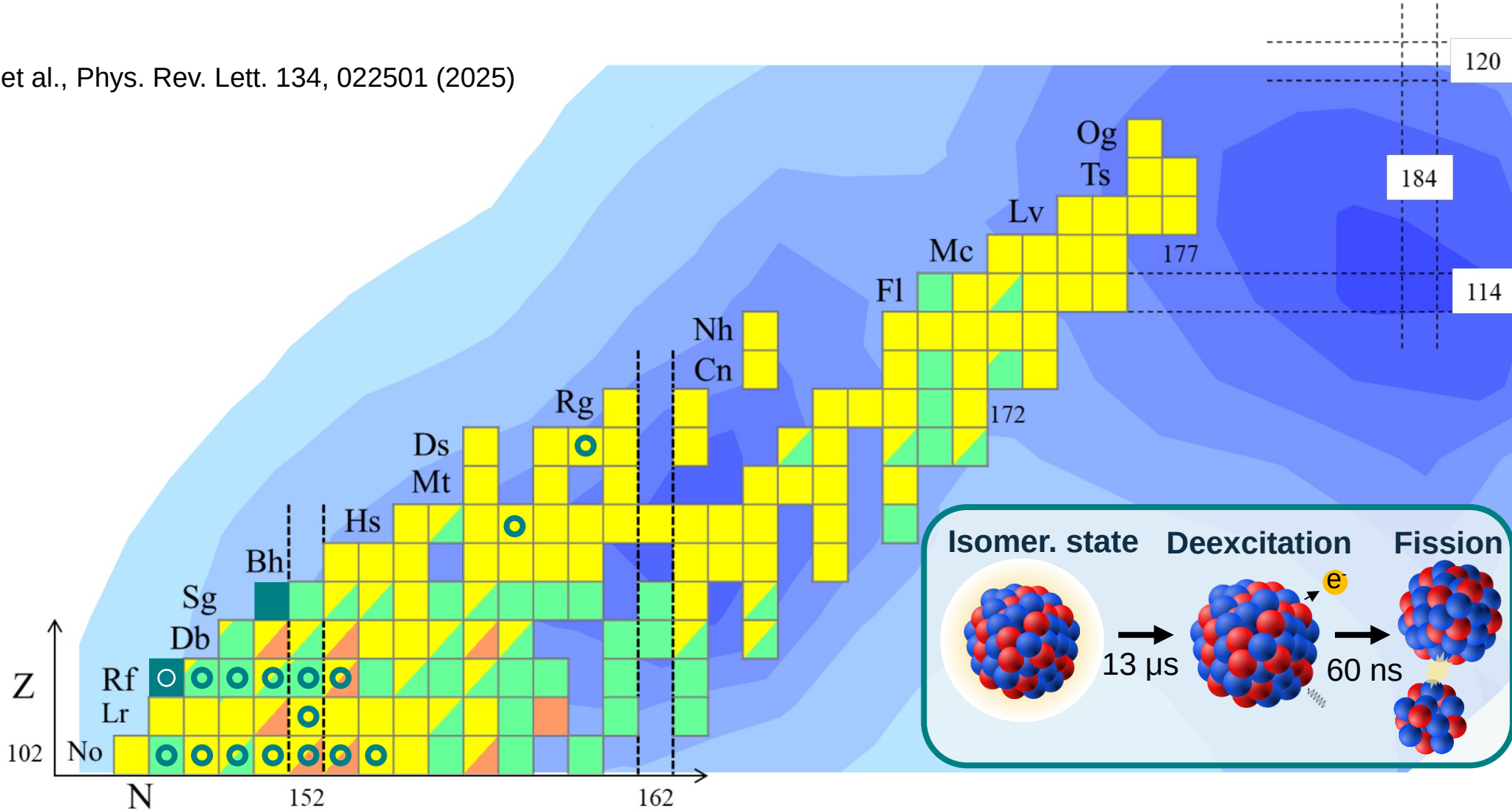
13

60

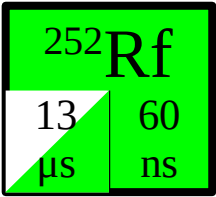
μs

ns

J. Khuyagbaatar, P. Mosat et al., Phys. Rev. Lett. 134, 022501 (2025)

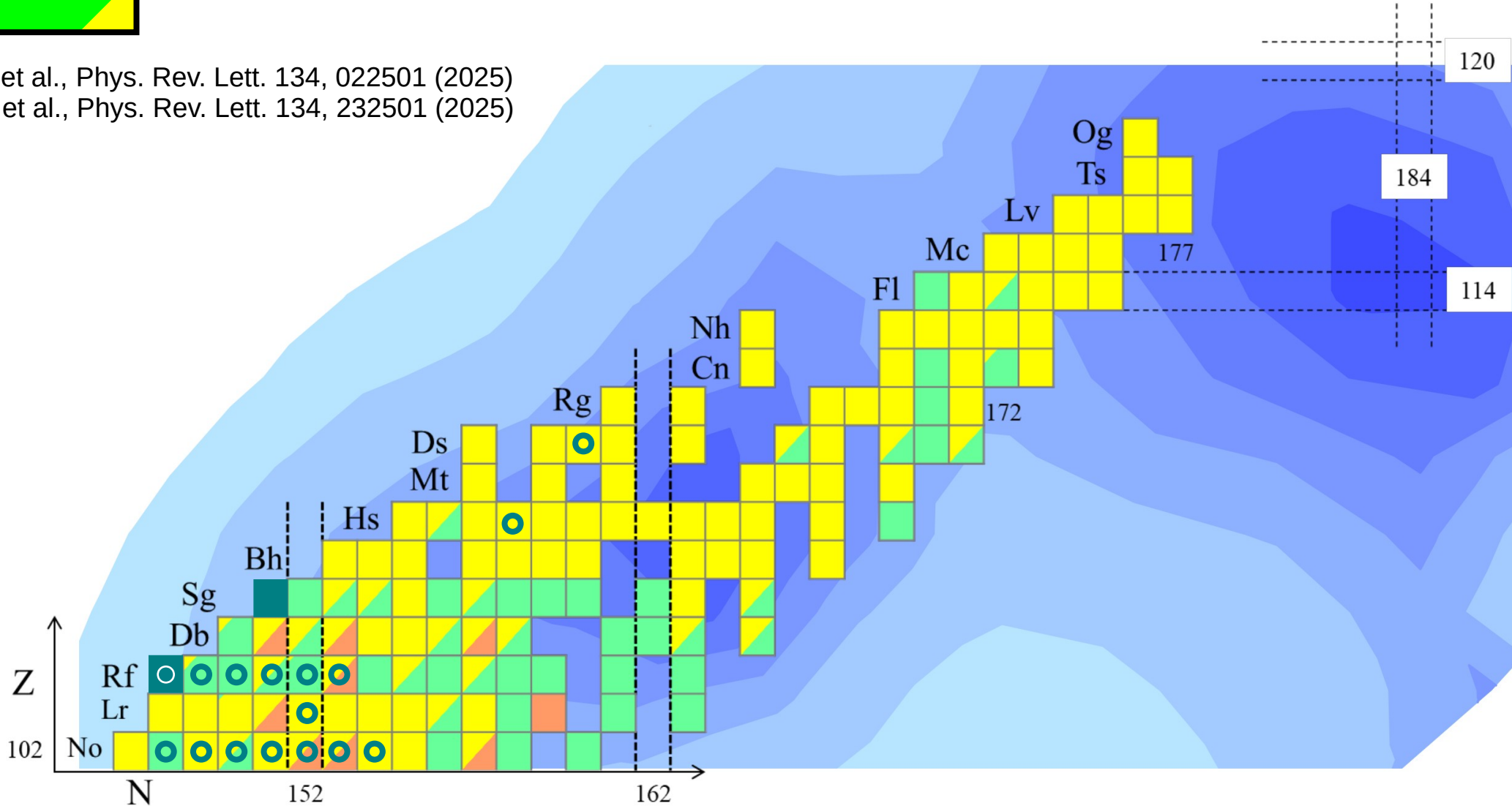


# Discovery of new isotopes

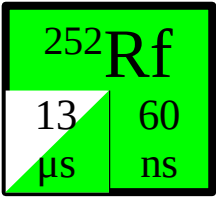


J. Khuyagbaatar, P. Mosat et al., Phys. Rev. Lett. 134, 022501 (2025)  
P. Mosat, J. Khuyagbaatar et al., Phys. Rev. Lett. 134, 232501 (2025)

Clouds of stability confirmed in <sup>252</sup>Rf  
Towards the isotopic border of seaborgium



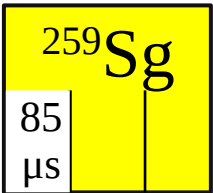
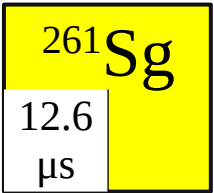
# Discovery of new isotopes



J. Khuyagbaatar, P. Mosat et al., Phys. Rev. Lett. 134, 022501 (2025)  
P. Mosat, J. Khuyagbaatar et al., Phys. Rev. Lett. 134, 232501 (2025)

# Discovery of new K isomers

P. Mořat', B. Andel, J. Khuyagbaatar et al.,  
Physical Review C 114, 034321 (2026)



For the first time  
in seaborgium

Clouds of stability confirmed in 252Rf

Towards the isotopic border of seaborgium

K isomerism observed in seaborgium

