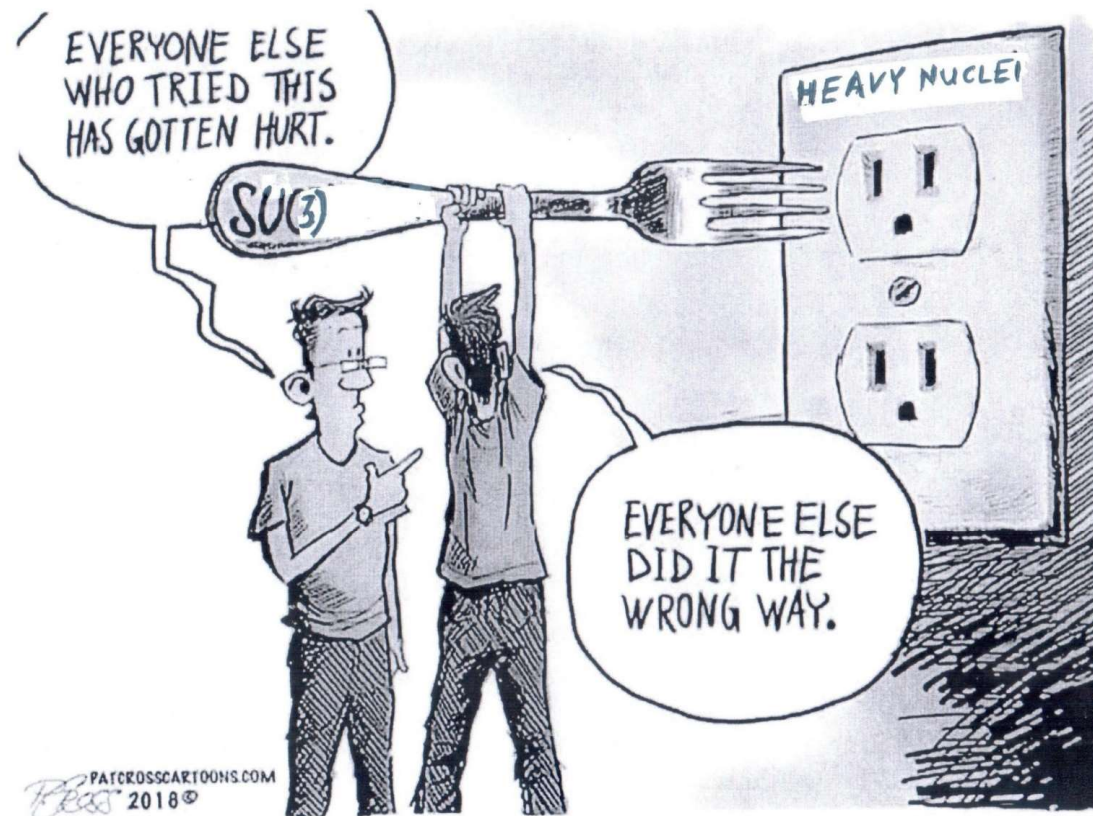


Current status of proxy-SU(3)

Dennis Bonatsos (emeritus researcher)
INPP, NCSR Demokritos

Proxy-SU(3) (2017)



Project 1: spectra and $B(E2)$ s

- Proxy-SU(3) already successful in predicting without free parameters
 - collective deformations
 - regions of shape coexistence
 - regions of triaxiality
- Calculate spectra and $B(E2)$ s within proxy-SU(3)
- Higher order terms (3-body, 4-body) needed in the spectra
 - in order to break the degeneracy of the gsb and gamma-1 band
- No microscopic model can predict the $B(E2)$ s without effective charges

H.F.R.I. proposal no. 23357

SCAN (Shape Coexistence in Atomic Nuclei)

- 3 years, 285.000 €
- A. Martinou (postdoc)
- K. Karakatsanis (postdoc)
- S. Peroulis (Ph.D. candidate)

Project 2: Nuclei with $B_{4/2} < 1$

$$R_{4/2} = E(4)/E(2)$$

$$U(5) \ 2.0 \quad O(6) \ 2.5 \quad SU(3) \ 3.33$$

$$E(5) \ 2.20 \quad Z(5) \ 2.35 \quad X(5) \ 2.90$$

$$B_{4/2} = B(E2; 4 \rightarrow 2) / B(E2; 2 \rightarrow 0)$$

$$U(5) \ 2.0 \quad O(6) \ 1.43 \quad SU(3) \ 1.43$$

$$E(5) \ 1.67 \quad Z(5) \ 1.59 \quad X(5) \ 1.60$$

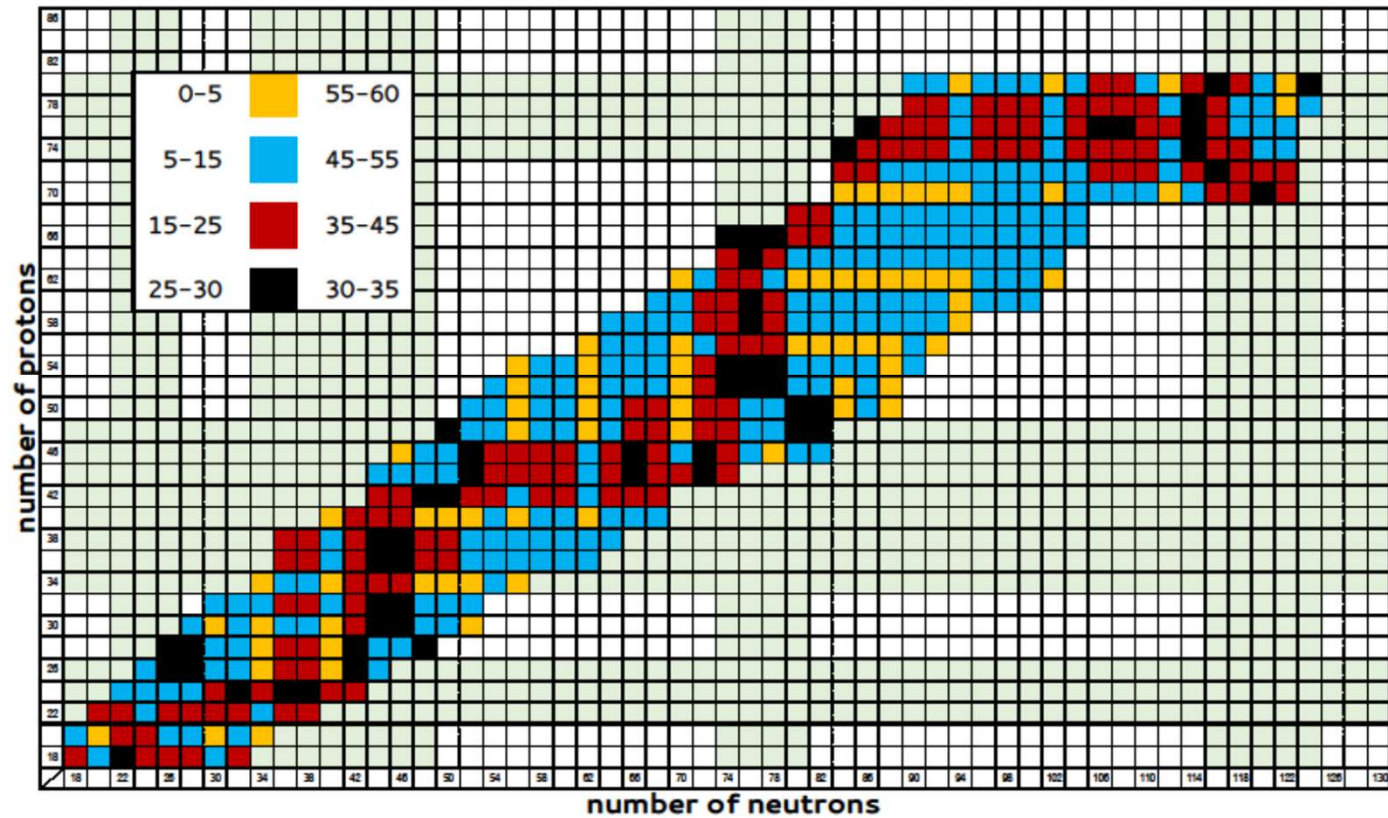
Nuclei with $B_4/2 < 1$

in more than 10 years

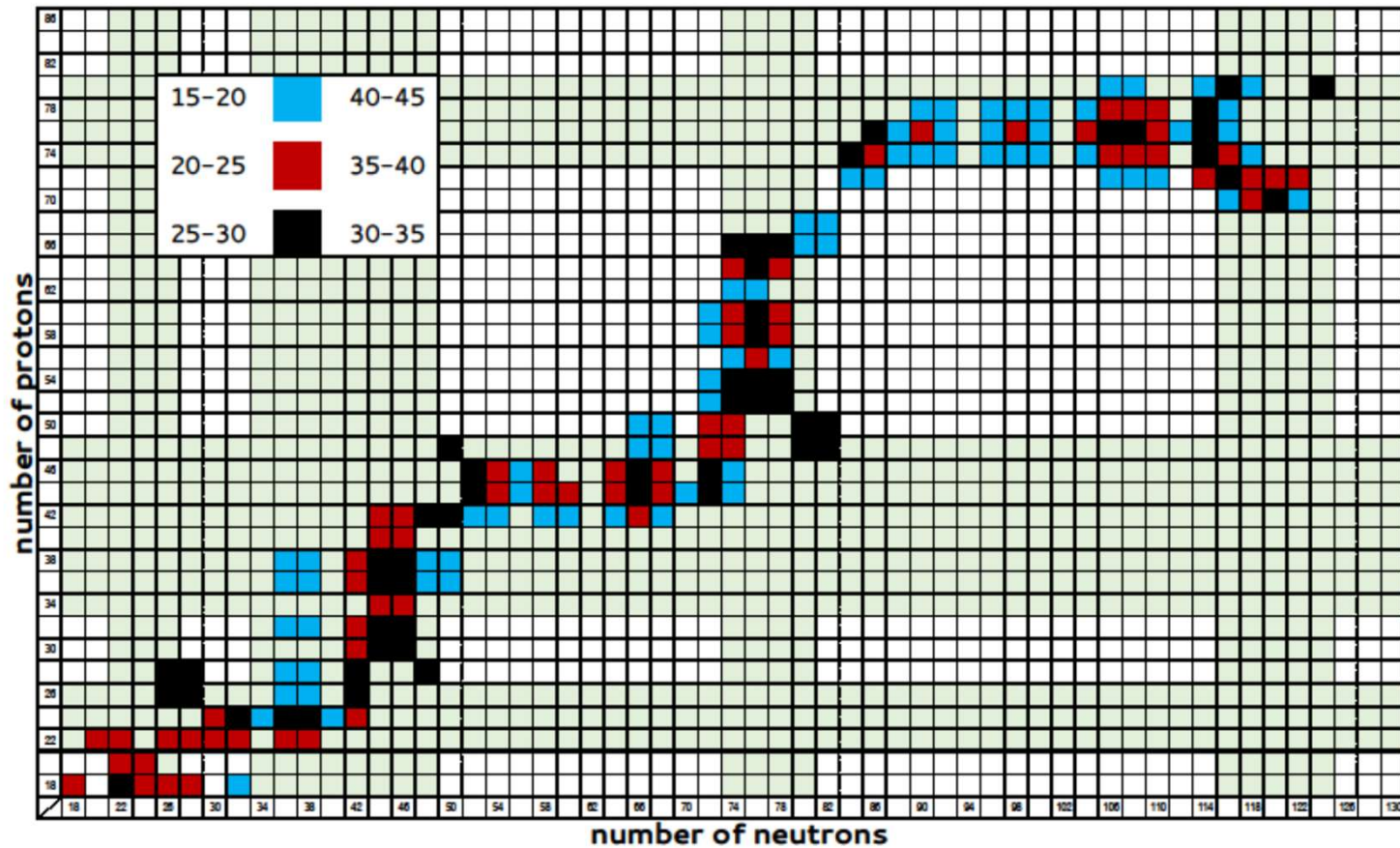
	Z	N
166W	74	92
168,170Os	76	92,94
172Pt	78	94
190,192,194,196,198Hg	80	110-118
94,96Sr	38	56,58
110,112Mo	42	68,70
114Pd	46	68

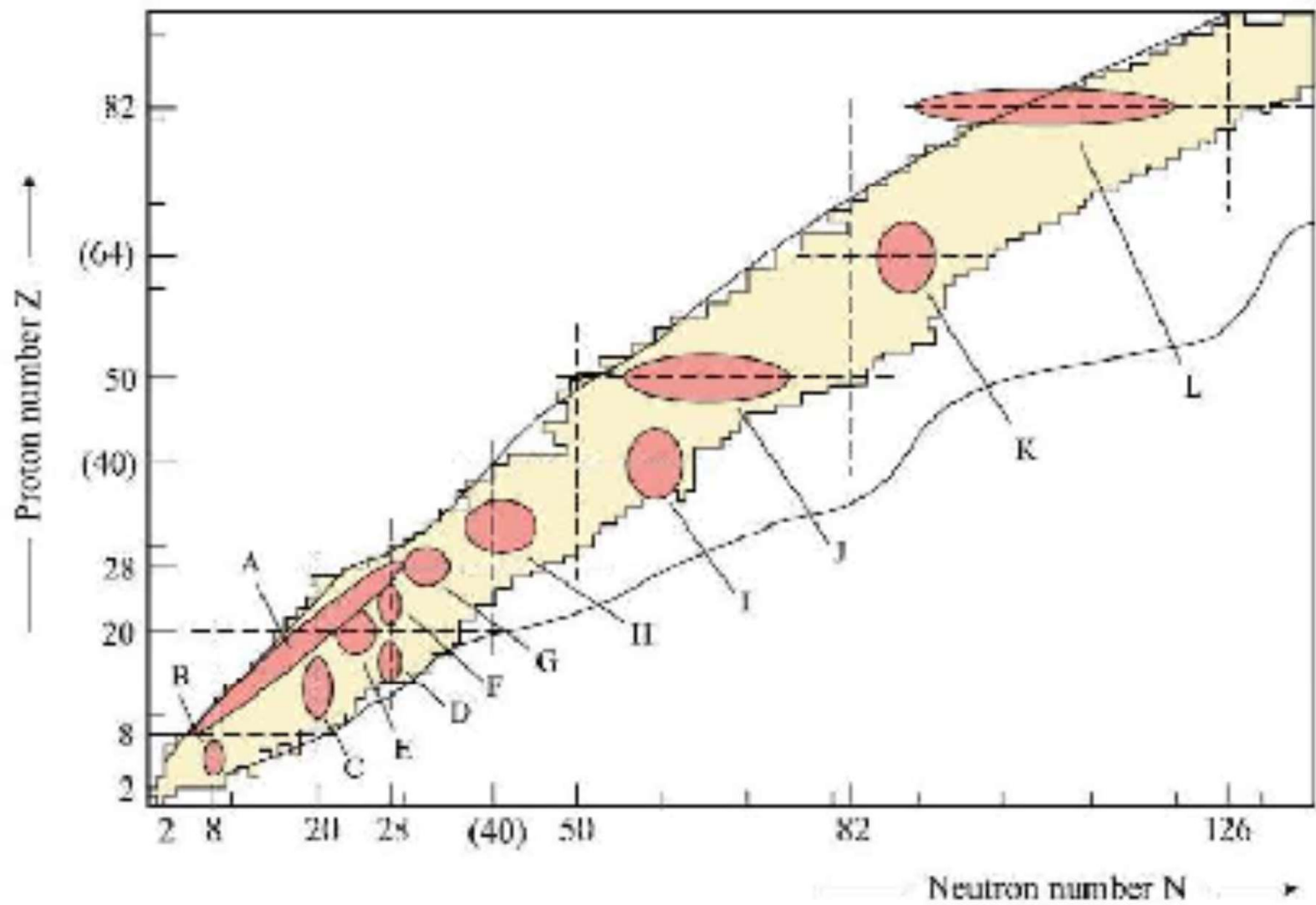
triaxiality in proxy-SU(3)

Atoms 13 (2025) 47

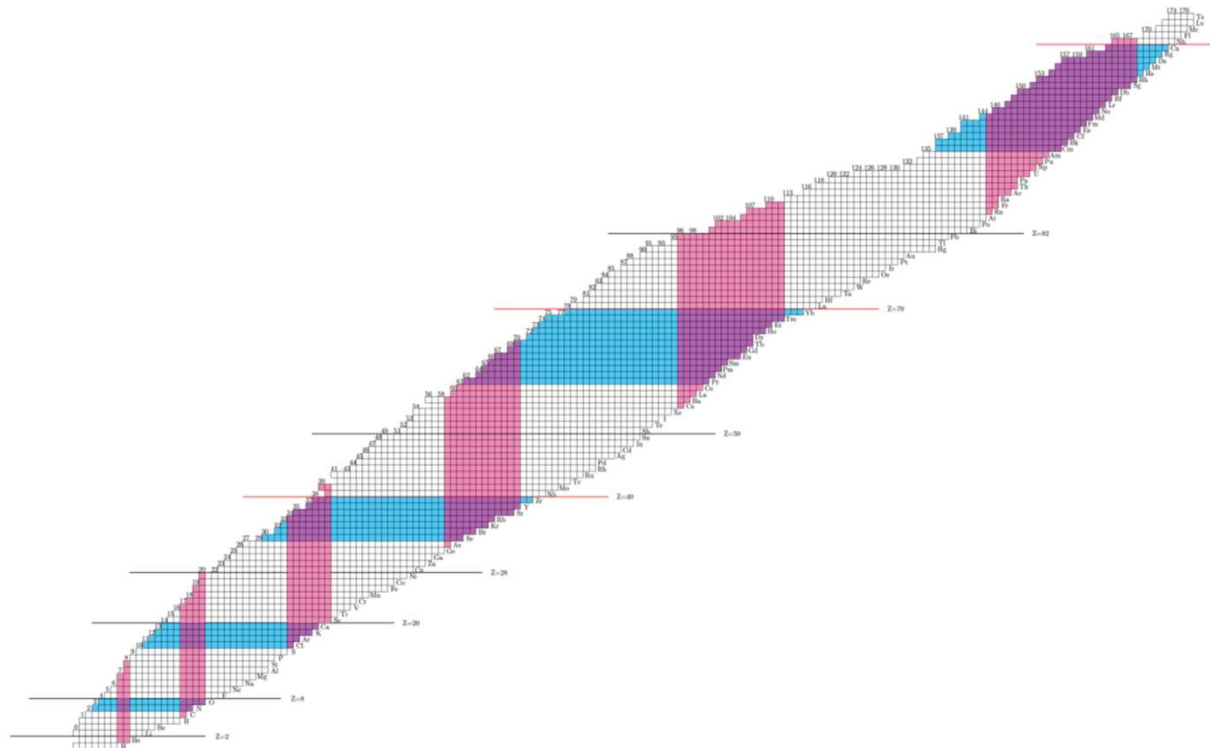


large triaxiality in proxy-SU(3)_



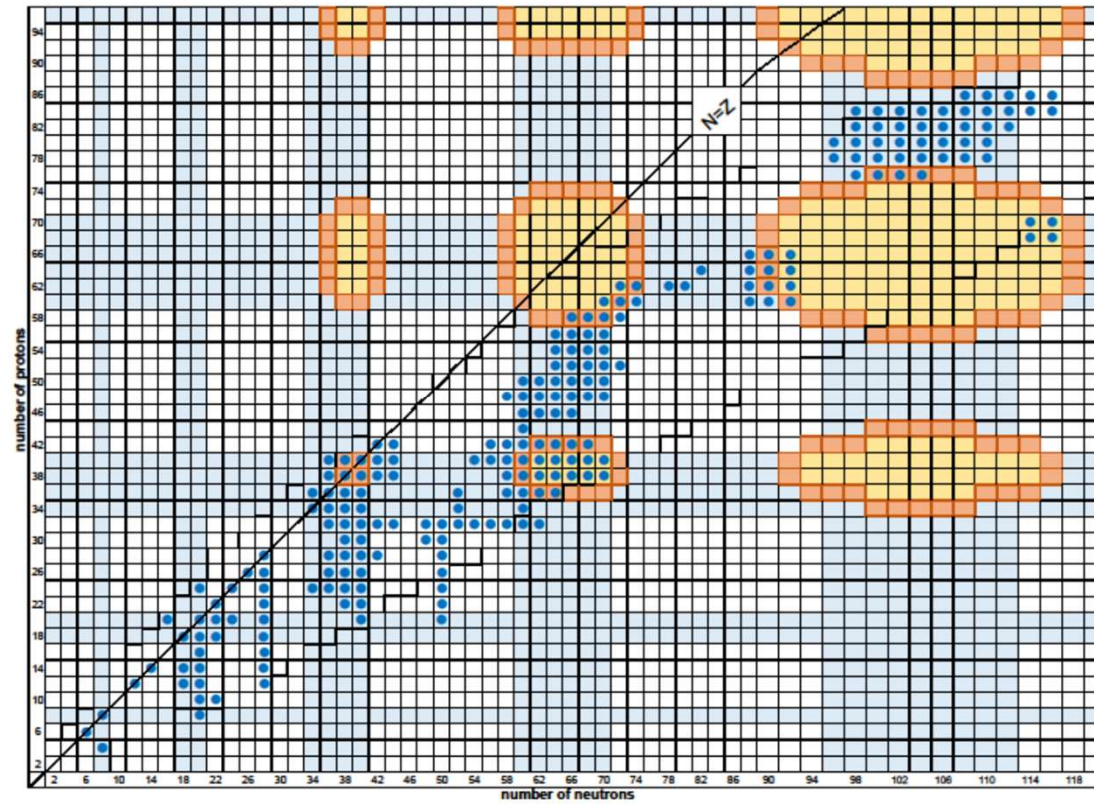


proxy-SU(3) symmetry dual shell mechanism
for shape coexistence
A. Martinou et al. EPJA 57 (2021) 84



nuclei with shape coexistence

Atoms 11 (2023) 117 (cover story)



- Triaxiality in proxy-SU(3)
22-26, 34-48, 74-80, 116-124, 172-182
- Shape coexistence in proxy-SU(3)
7-8, 17-20, 34-40, 59-70, 96-112, 146-168
- SC corroborated by
CDFT calculations with DDME2 functional
HFB calculations with Skyrme-Skl3

p-n $0[110]$ pairs

- $0[110]$ pairs maximize p-n interaction
- Nilsson notation $K[N N_z \Lambda]$
- Identical angular momenta
- Maximal spatial overlaps
- Intruder orbitals involved
- Responsible for onset of deformation
- Signify the borders of SC regions