

B2 samples 2009



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Radionuclides in B2 (500 g sample)

4 nuclides: 0.1 - 2 Bq g⁻¹

³H, ⁵⁵Fe, ⁸⁹Sr, ⁹⁰Sr

Gross Beta

(i.e., ⁸⁹Sr, ⁹⁰Sr and ⁹⁰Y)



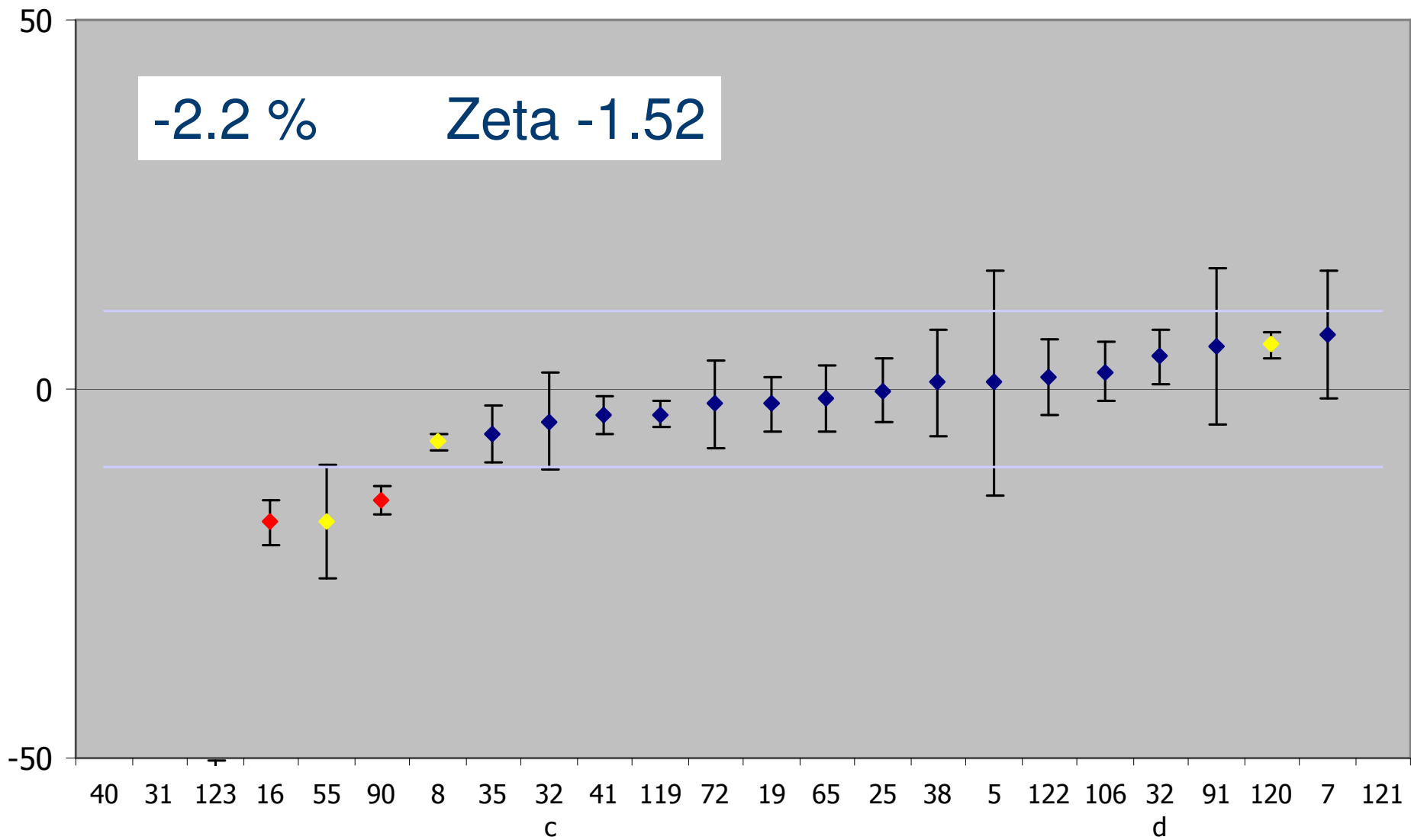
Participants: 29

2008 (31)

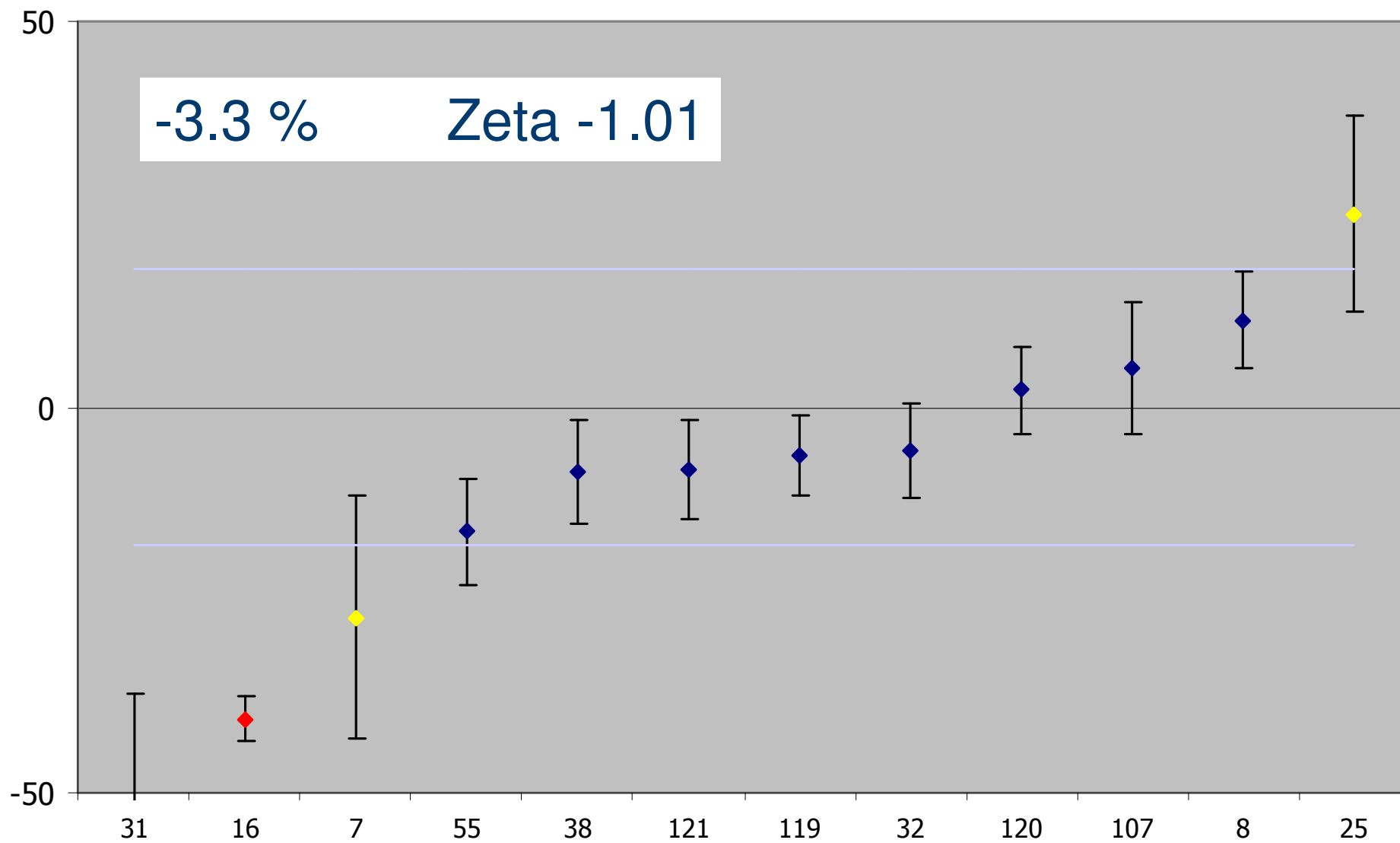
B2 composition (Bq g⁻¹)

	NPL	Labs	%	Zeta
³H	1.389(15)	1.359(13)	-2.2	-1.52
⁵⁵Fe	1.53(3)	1.48(4)	-3.3	-1.01
⁸⁹Sr	0.463(4)	0.398(8)	-14	-7.78
⁹⁰Sr	1.153(10)	1.158(14)	0.4	0.27

Deviation (%) H-3 B2



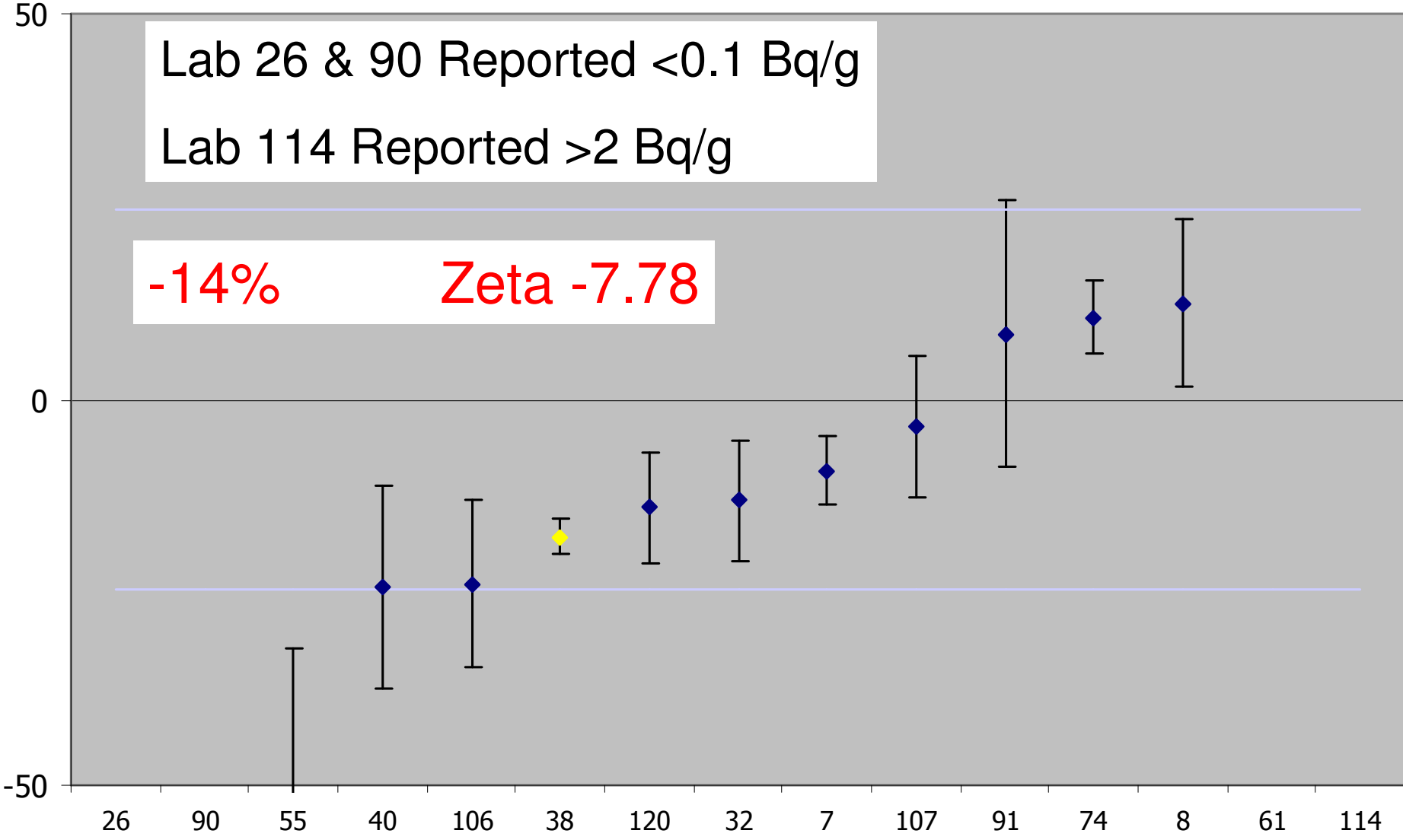
Deviation (%) Fe-55 B2



Deviation (%) Sr-89 B2

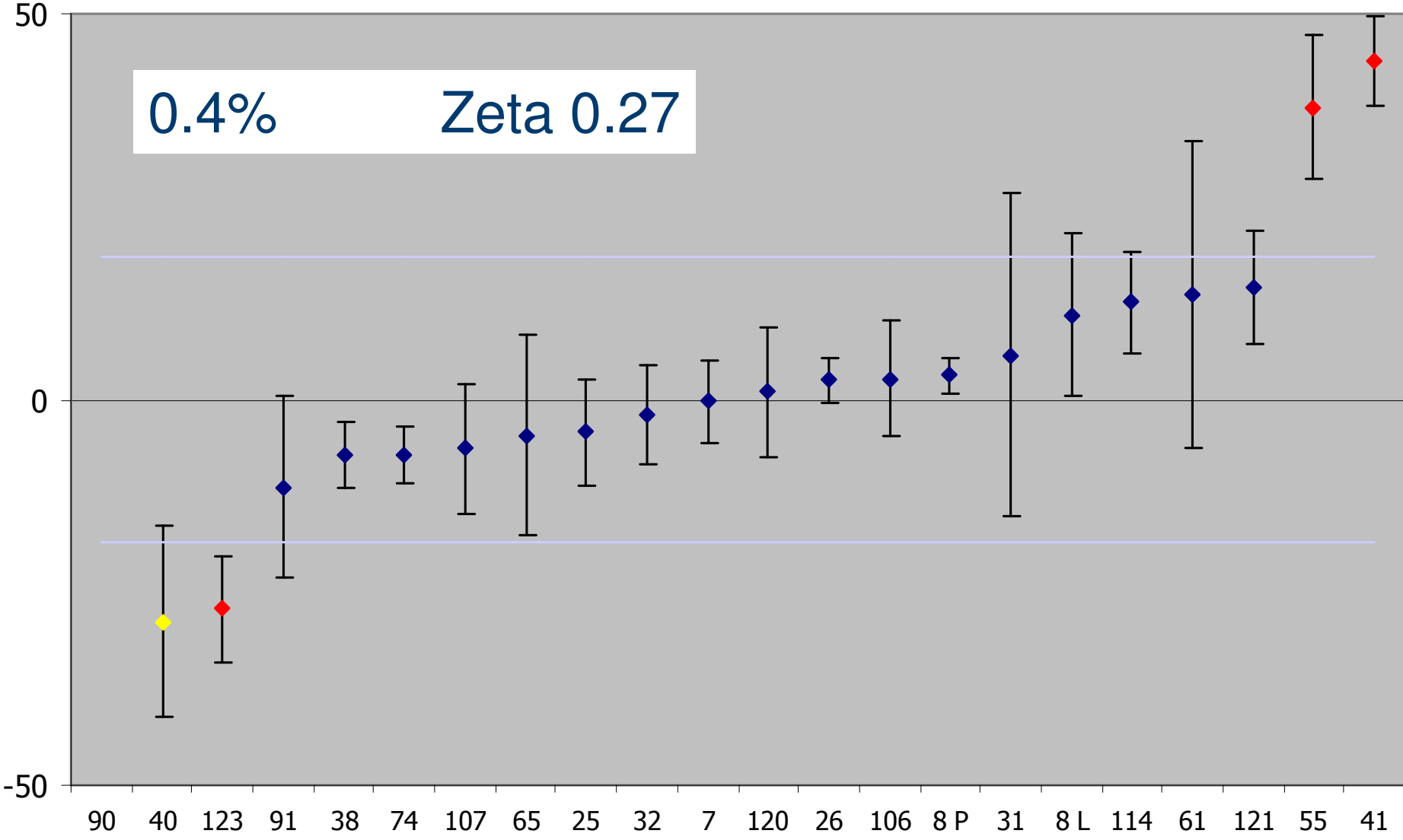
Lab 26 & 90 Reported <0.1 Bq/g
Lab 114 Reported >2 Bq/g

-14% **Zeta -7.78**



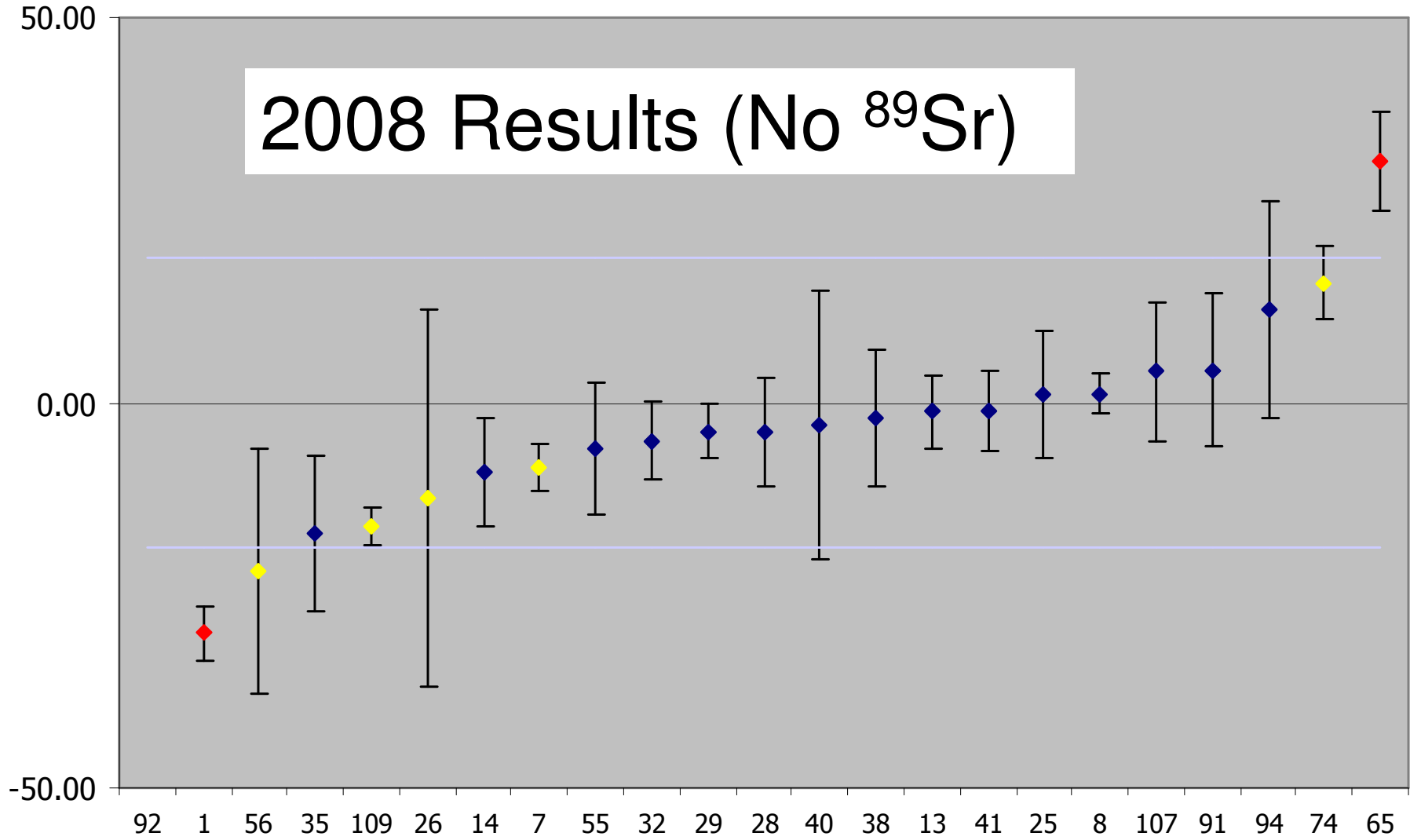
Deviation (%) Sr-90 B2

0.4% Zeta 0.27

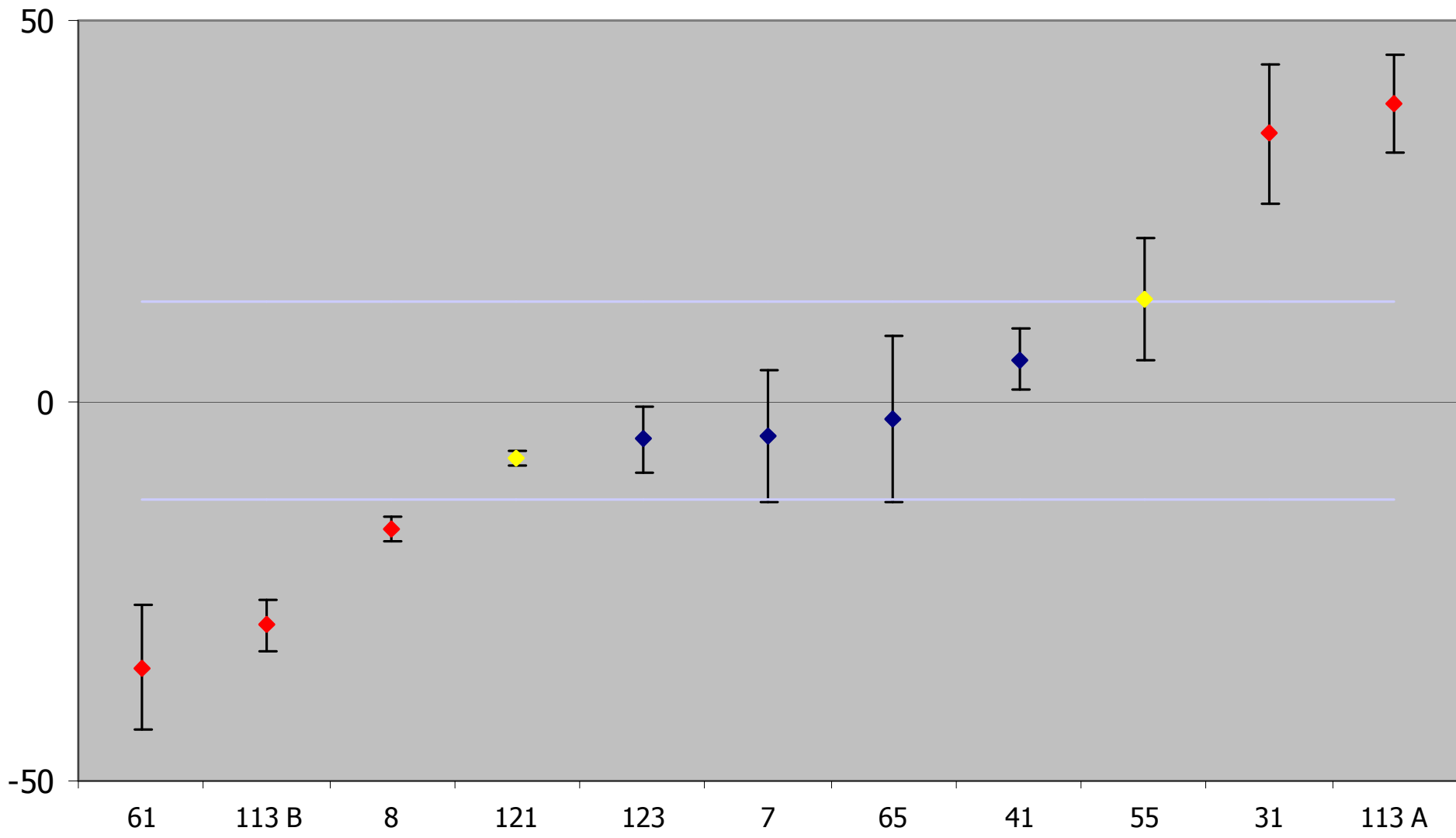


Deviation (%) Sr-90 B2

2008 Results (No ⁸⁹Sr)



Deviation (%) Gross beta B2



Sr-90 and Sr-89

Both high-yield beta emitting fission products

Impossible to separate chemically

	half-live (d)	E_{\max} (keV)
Sr-89	50.57(3)	1495.1(22)
Sr-90	10551(14)	545.9(14)
Y-90	2.6684(13)	2279.8(17)

What to do?

- (i) Wait until Y-90 / Sr-90 equilibrium (~20 d). Count. Wait for ~50 d. Count again.

- (ii) Separate Y-90 from Sr and note time. Count several times within the first 15 d.

- (iii) Combination of Cerenkov counting and LSC. Separate Y-90 from Sr. Determine Sr-89 (Cerenkov). Determine Sr-89 and Sr-90 (LSC). Subtract Sr-89 from Sr-90.

- (iv) Spectrum deconvolution.

Summary of Results PTE 2007-2009 (‘in agreement’)

	2009	2008	2007
^3H	63%	79%	76%
^{55}Fe	67%	54%	57%
^{89}Sr	60%		50 %
^{90}Sr	77%	74%	47%

Comparison of Results PTE 2009 & 2007

(2009) B2

(2007) B2

63%

'in agreement'

57%

13%

'questionable'

15%

24%

'discrepant'

28%

Thank you