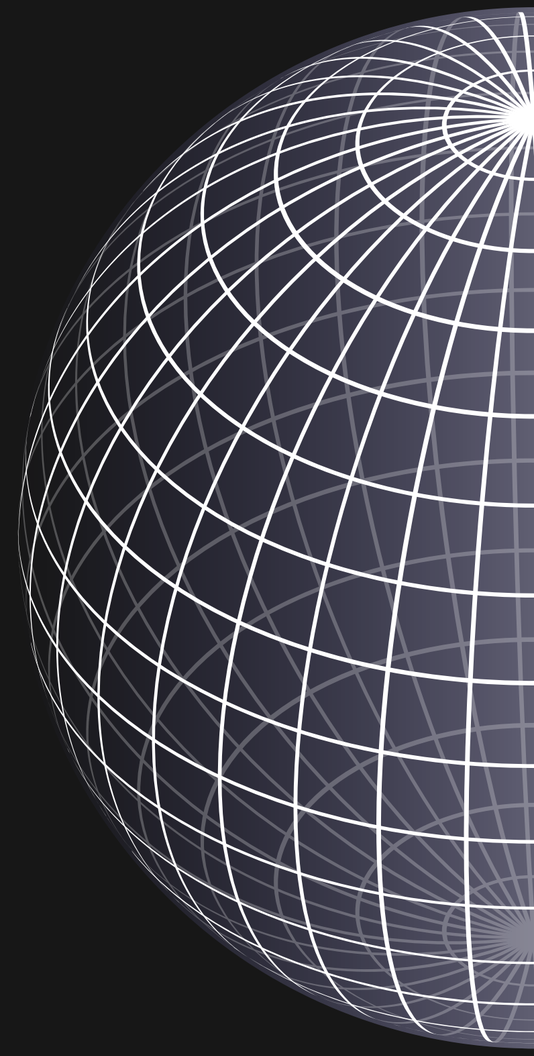
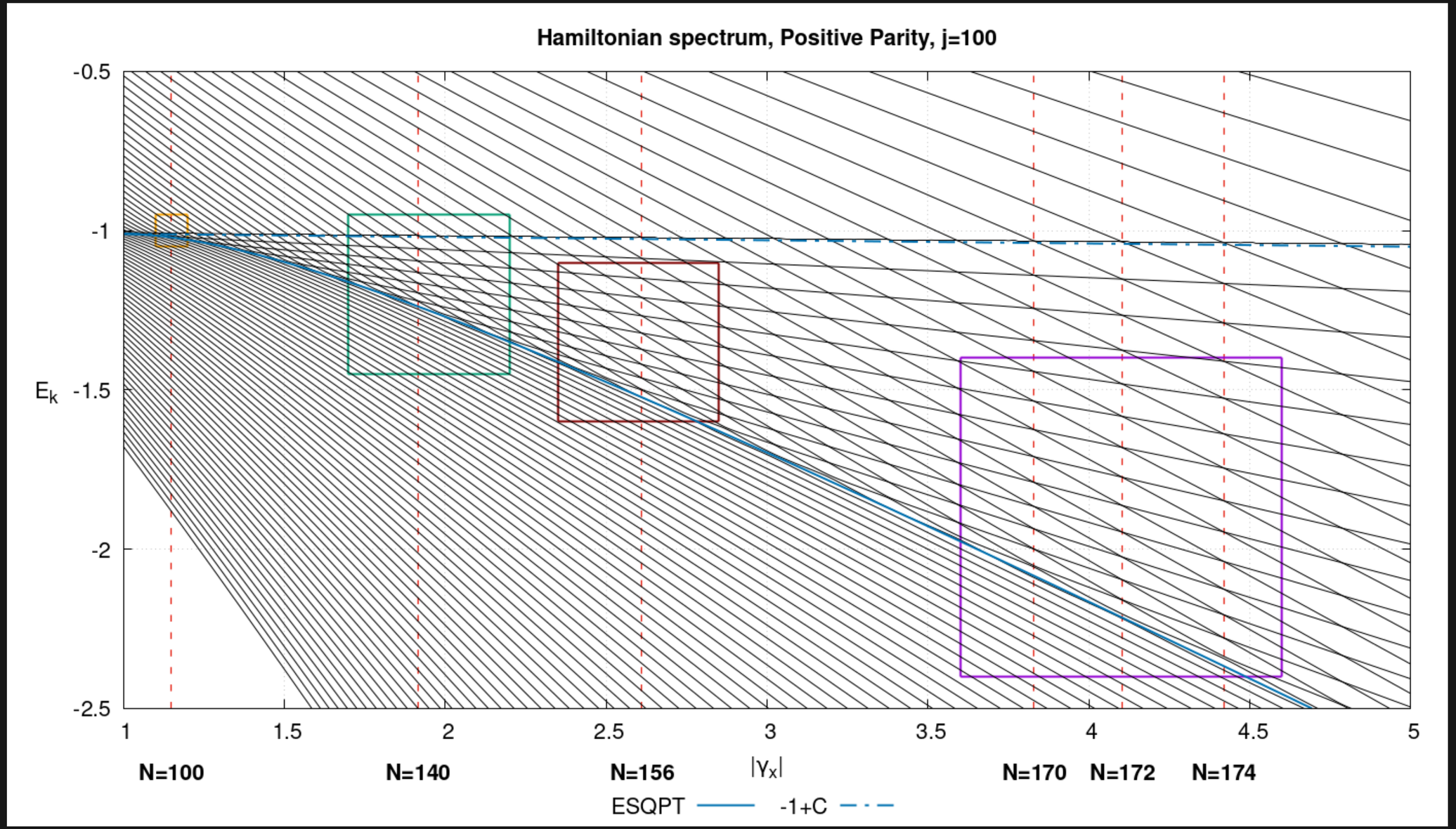
INCREASING J

Isaías Siliceo



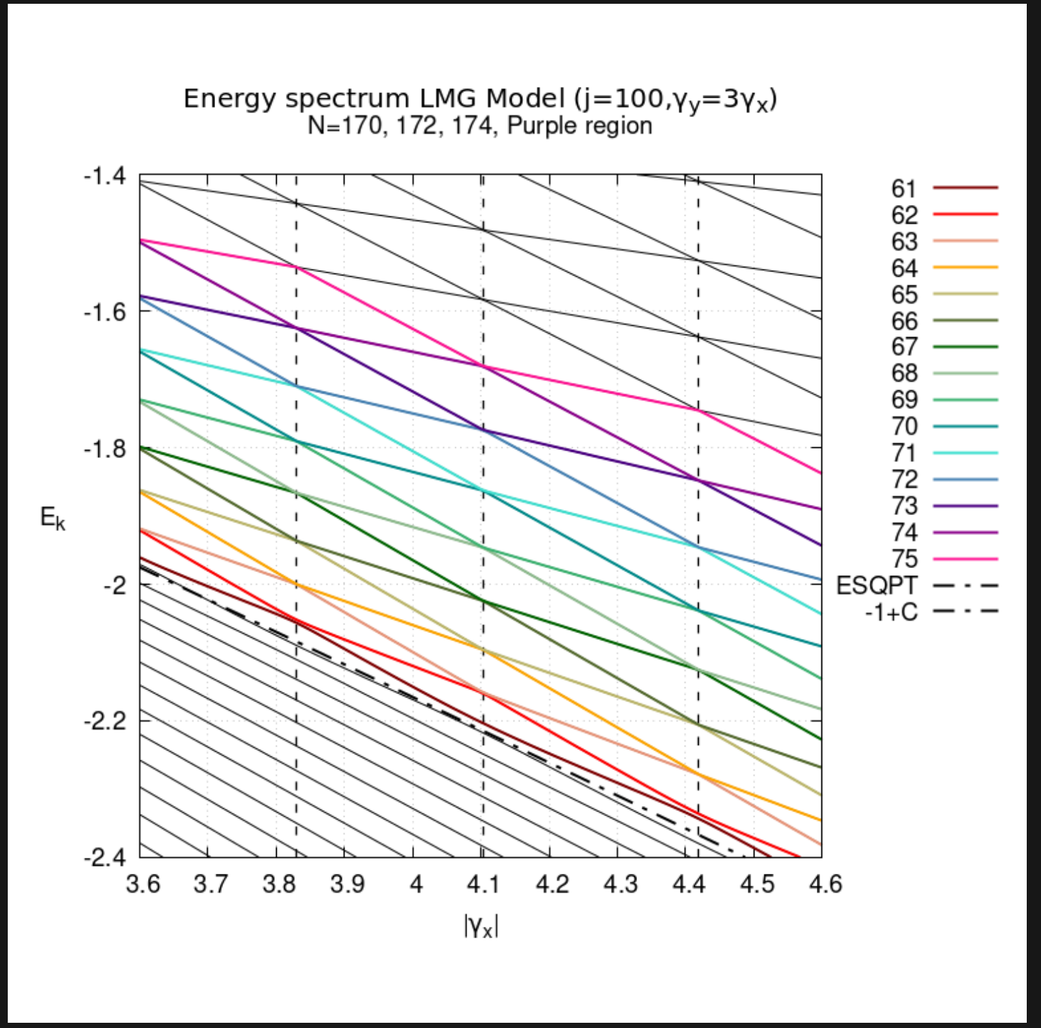
LMG energy spectrum



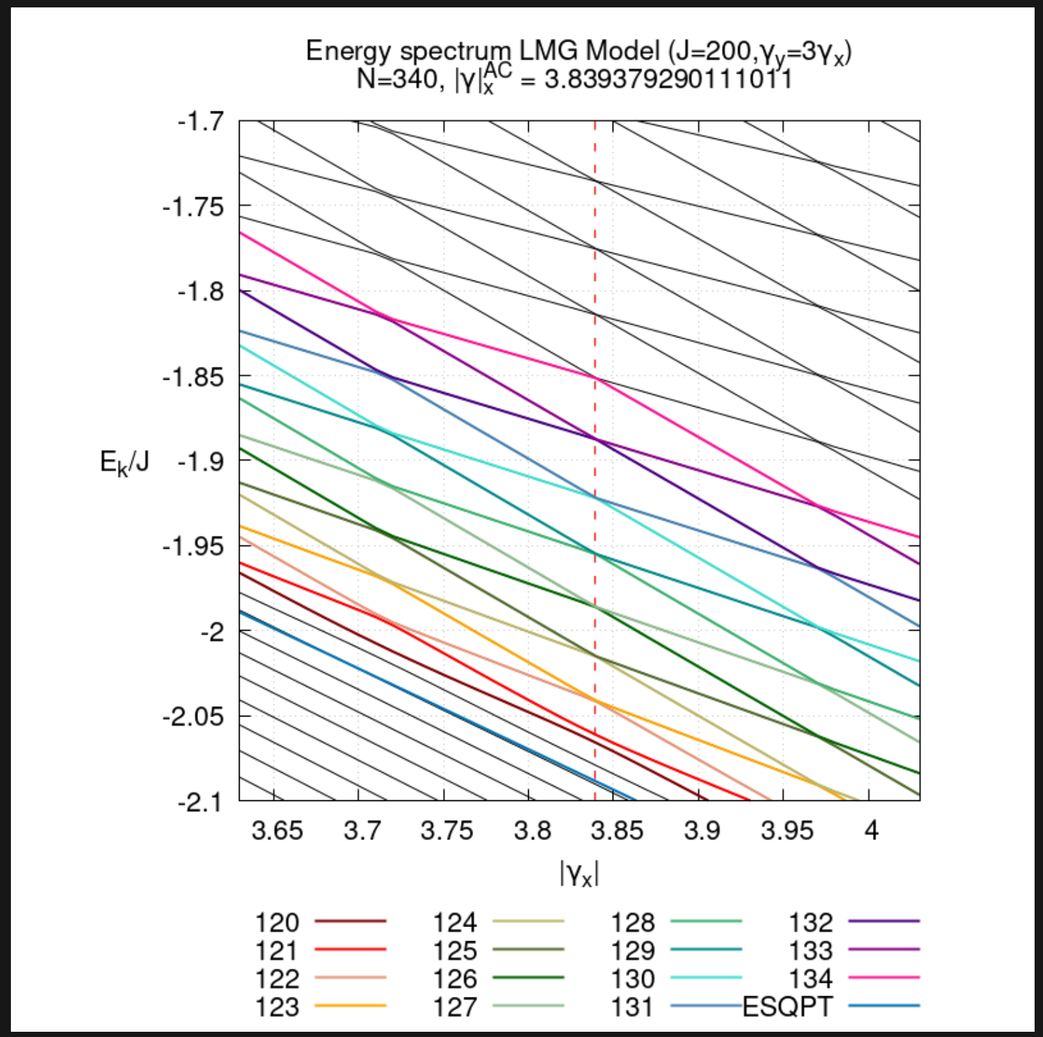
≡ Previous result: J=100, N=170

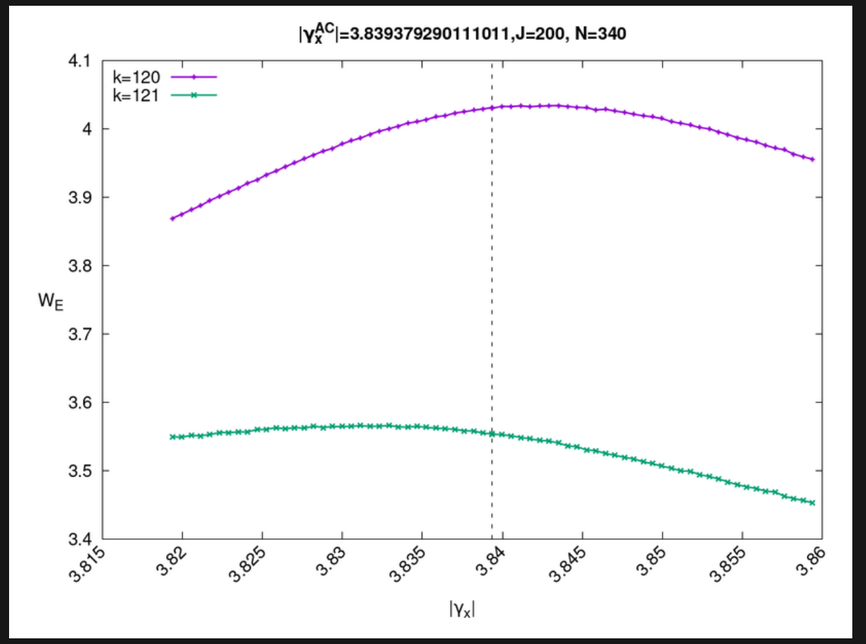
- γx AC : -3.829756785624518
  - Best result of sigma.

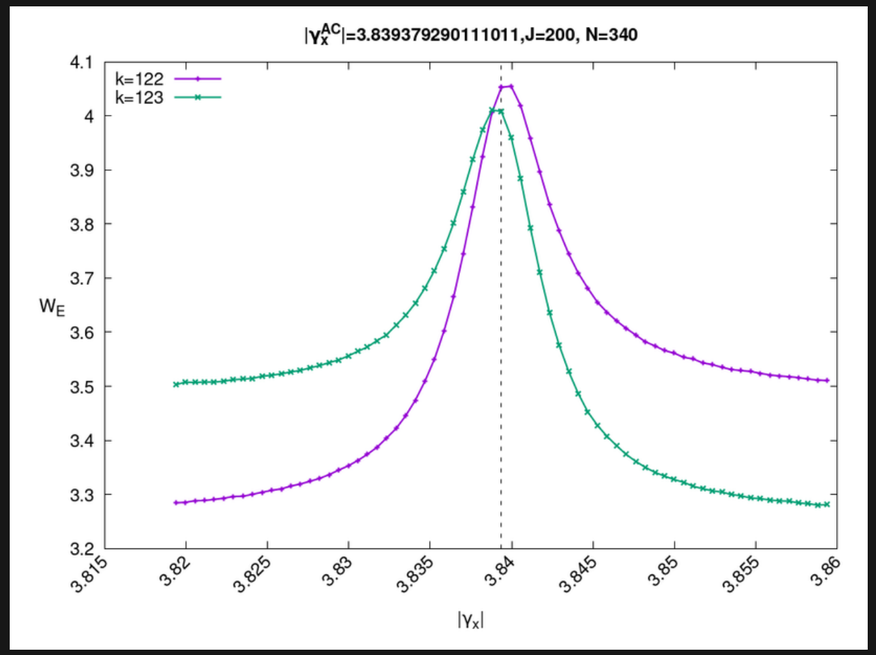
- Similar values of γx for greater values of J.
  - J = 100 , N = 170, γxAC =-3.829756785624518
  - J = 200 , N = 340, γxAC =-3.839379290111011
  - J = 500 , N = 850, γxAC =-3.845152792802908
  - J = 800 , N = 1358, γxAC =-3.814806117496742
  - J = 1000 , N = 1698, γxAC =-3.821599960629344



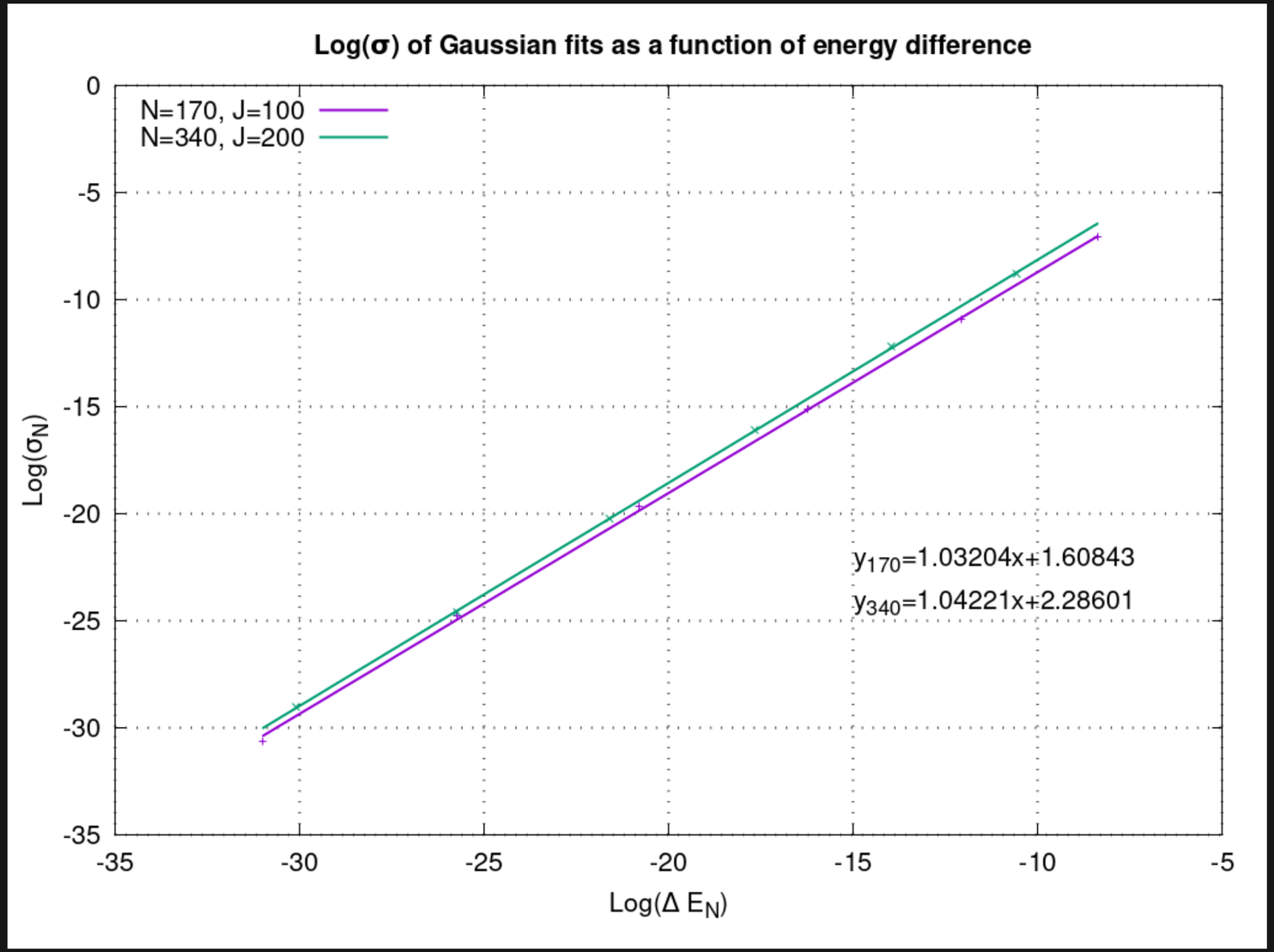
≡ J=200, N=340


Energy spectrum LMG Model (J=200,γy=3γx)
N=340, |γ|x^AC = 3.839379290111011
Ek/J
|γx|
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
ESQPT


|γx^AC|=3.839379290111011,J=200, N=340
k=120
k=121
WE
|γx|


|γx^AC|=3.839379290111011,J=200, N=340
k=122
k=123
WE
|γx|

Linear fits of σ vs. ΔE_i



≡ J=500, N=850

Wolfram Mathematica:

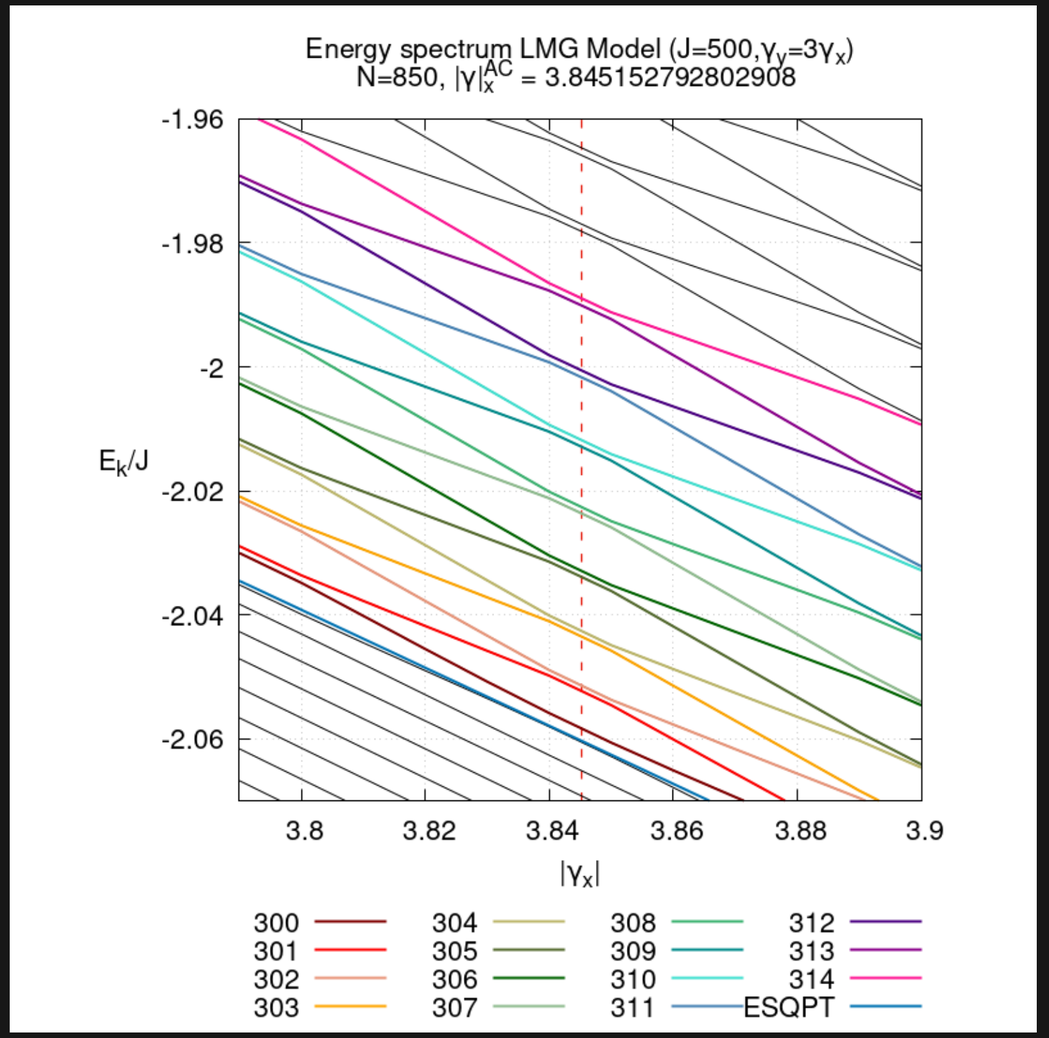
- Matrix, Eigenvalues & Eigenstates per γx : 15-16 min.
- 70 iterations: ~ 18 hrs per each pair
- 8 pairs of states: ~ 6 days

Output : Eigenvalues, Eigenvectors, γx Intervals

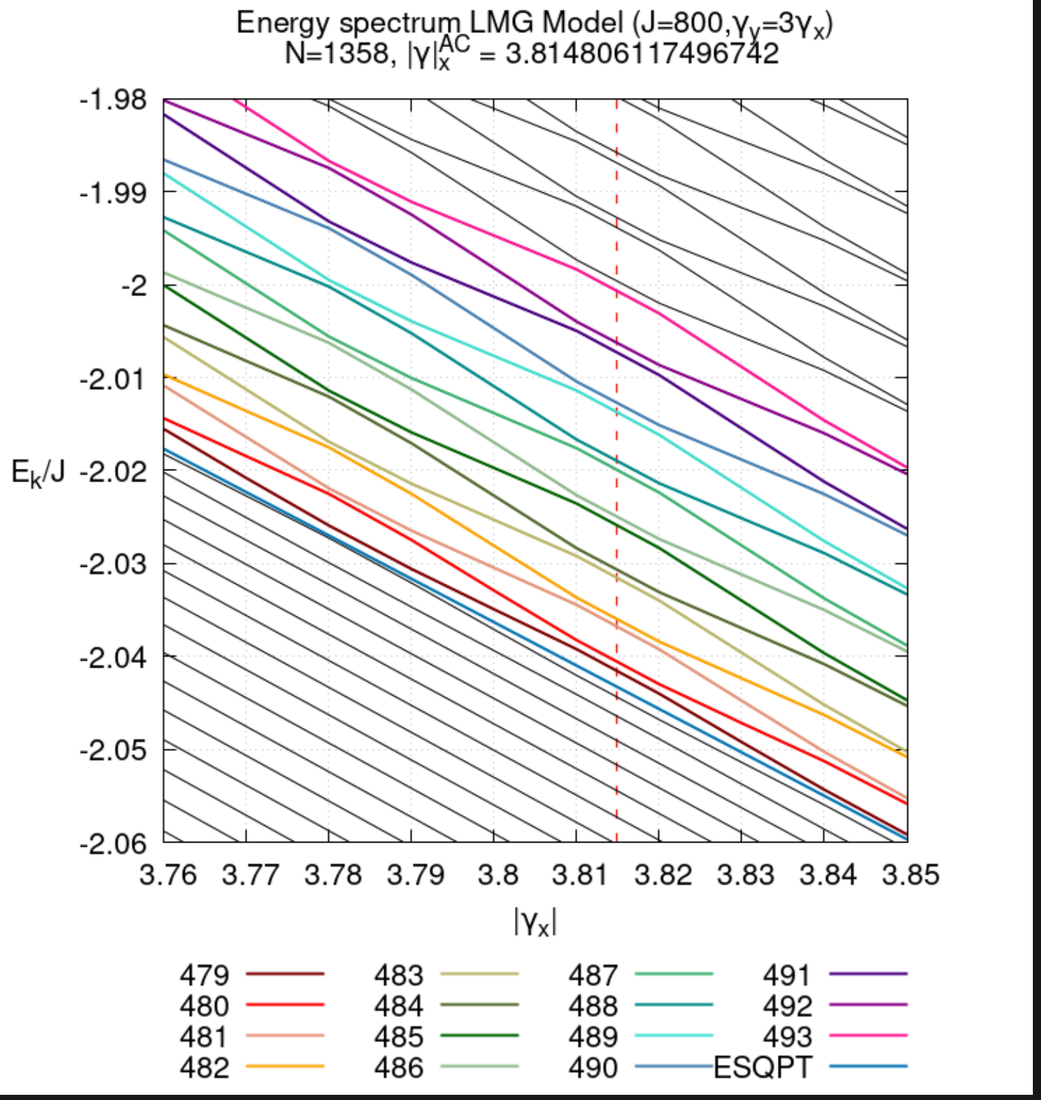
Fortran 90 :

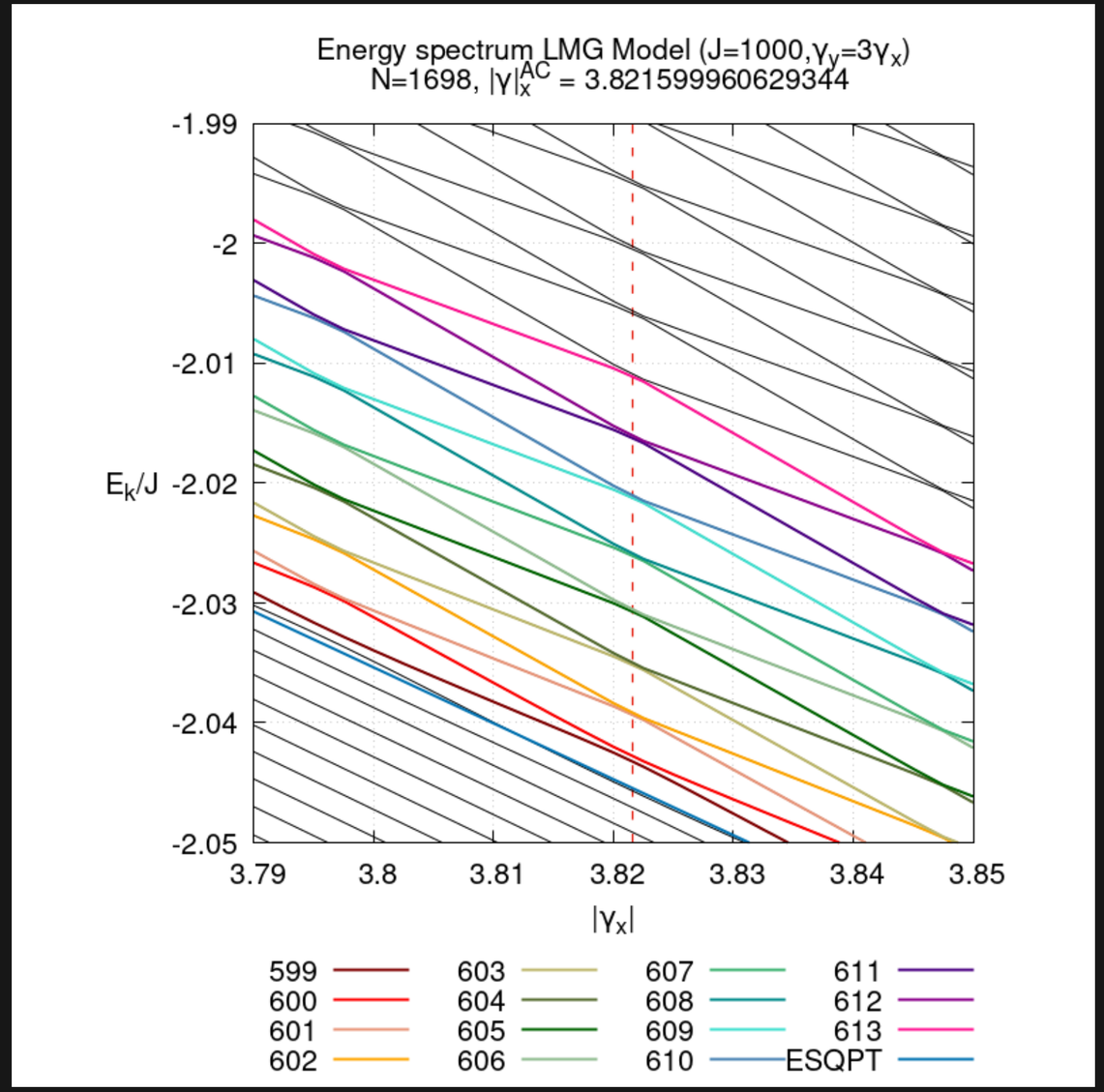
- Wehrl Entropy per state: > 20 min. (J=200)
- 16 states: > 5 hrs (J=200)

Output : γx / Energy_i / Wehrl Entropy

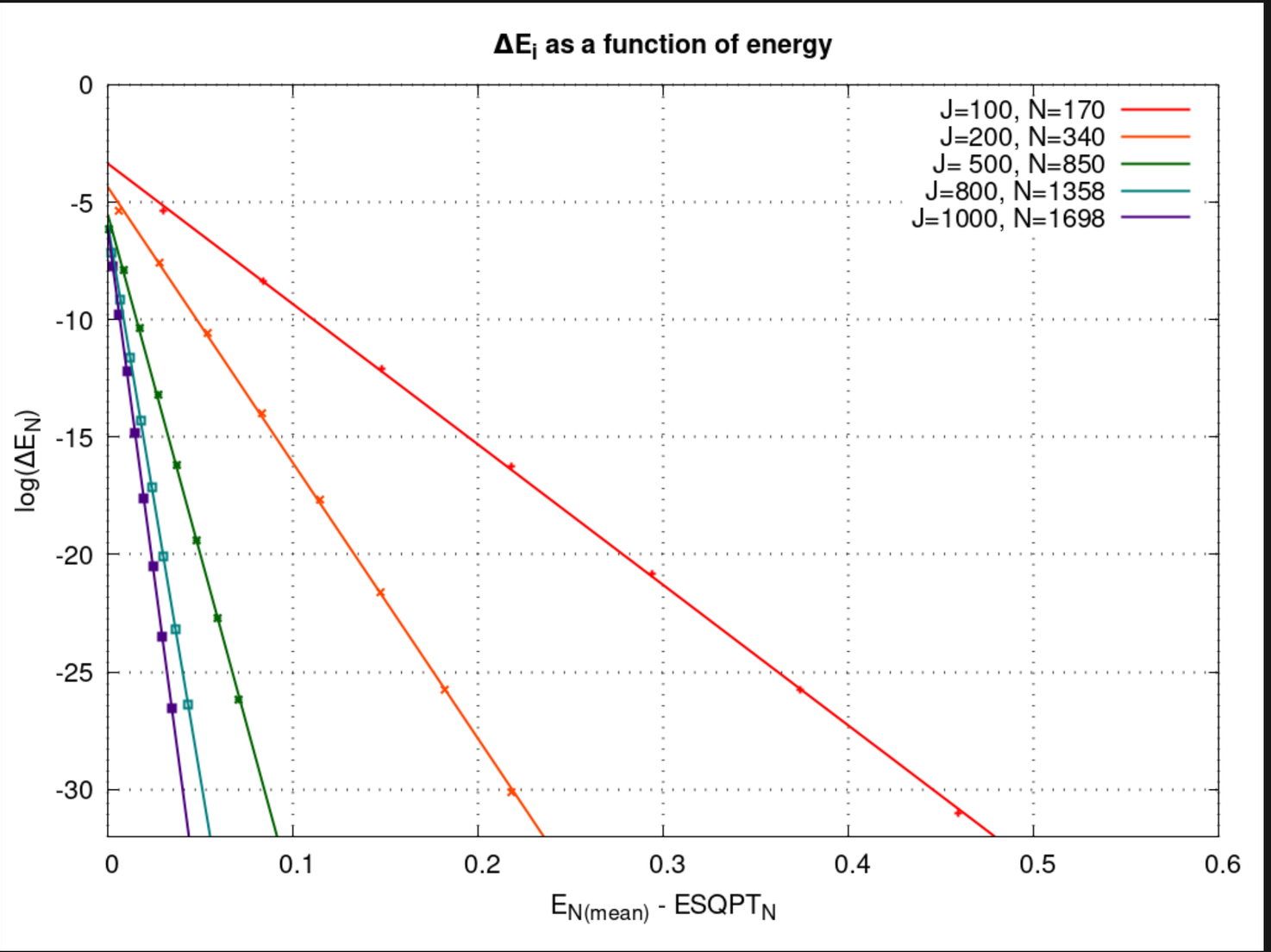


≡ J= 800 & J=1000


Energy spectrum LMG Model (J=800,γy=3γx)
N=1358, |γ|xAC = 3.814806117496742
-1.98
-1.99
-2
-2.01
-2.02
-2.03
-2.04
-2.05
-2.06
Ek/J
3.76 3.77 3.78 3.79 3.8 3.81 3.82 3.83 3.84 3.85
|γx|
479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 ESQPT


Energy spectrum LMG Model (J=1000,γy=3γx)
N=1698, |γ|xAC = 3.821599960629344
-1.99
-2
-2.01
-2.02
-2.03
-2.04
-2.05
Ek/J
3.79 3.8 3.81 3.82 3.83 3.84 3.85
|γx|
599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 ESQPT

ΔE_i vs (Emean – ESQPT)



$$\log(\Delta E_N) = m(E_{\text{mean}} - ESQPT) + b$$
$$\implies \Delta E_N = Ae^{m(E_{\text{mean}} - ESQPT)}$$

	J	m	b	A
0	100	-59.8086	-3.36192	0.034669
1	200	-117.4300	-4.36494	0.012715
2	500	-289.7390	-5.52707	0.003978
3	800	-471.5930	-5.94770	0.002612
4	1000	-590.1920	-6.15626	0.002120