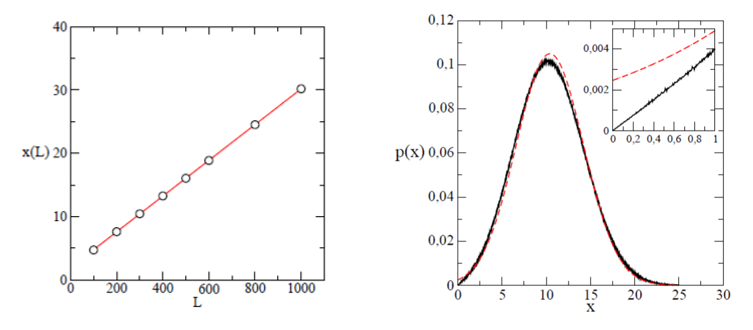
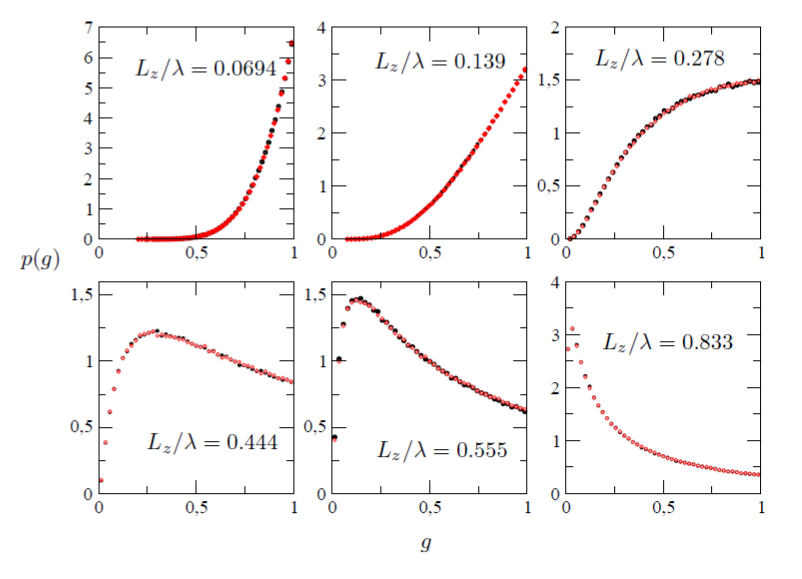
**Numerical P(g) Results**

**1D conductors in localized regime**

1D metals follow a simple log-normal distribution. And the mean conductance (roughly x) grows linearly with length. This has the consequence that P(g) has an exceptionally long tail towards the origin so that the average <g> is many orders of magnitude larger than the most probable value, g\*, and further, that these grow further apart with length. Physically, this means that the average conductance is dominated by exceedingly rare impurity distributions where the sample is almost transparent,

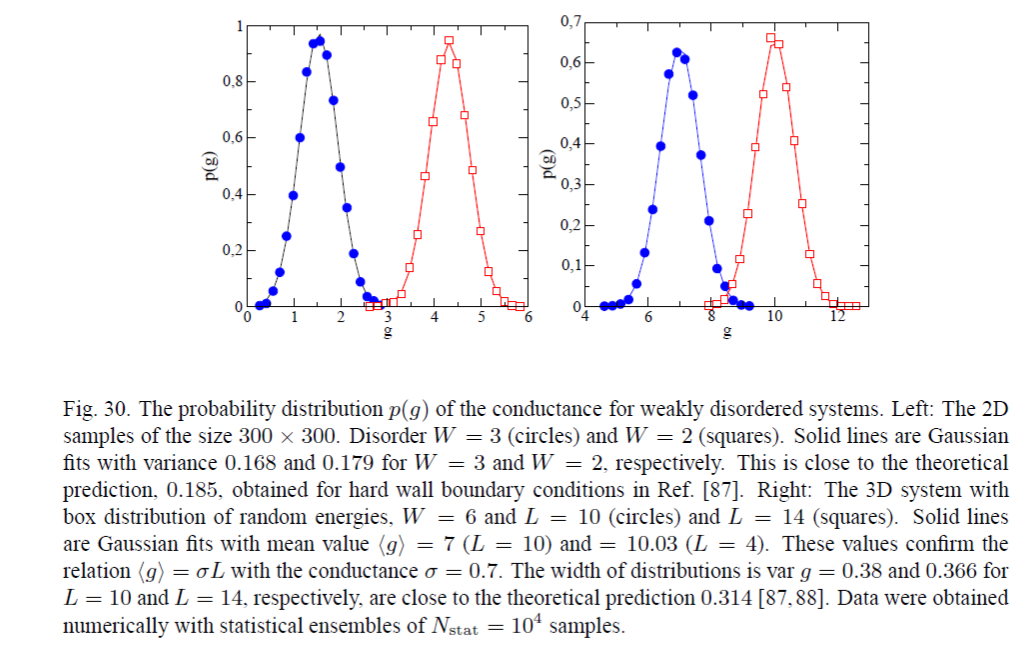


Plots for different levels of disorder are displayed. He makes note that in the tight-binding model used, the probability distribution depends on EF, disorder W, m.f.p., length, etc., only through the ratio L/ξ (he notates ξ = λ), so that different physical systems, produce the same P(g) plot for the same ratio.

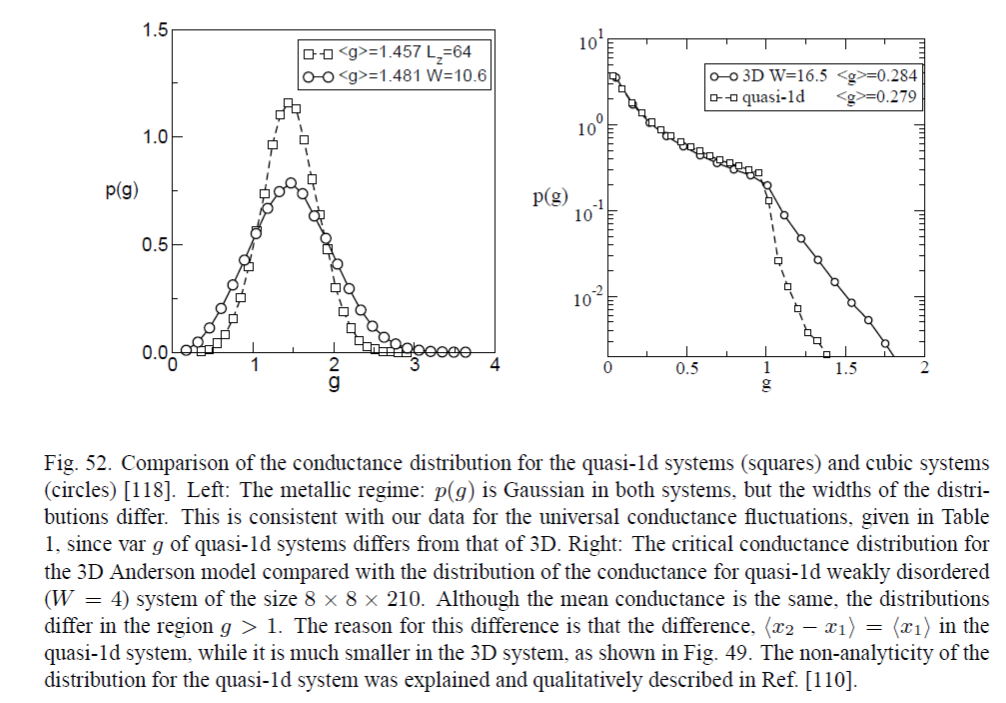


**2D, 3D conductors in metallic regime**

For 2D, 3D conductors in the diffusive regime, the probability distribution is indeed Gaussian. Further, he (Markos) says that it was shown analytically that the third cumulant for Q1D metals was 0, and for 3D metals, was equal to 10-3/<g>. On the right we have a Q1D metal and 3D metal with the same <g>. Can see that the 3D variance is smaller than Q1D (where is theoretical support?)

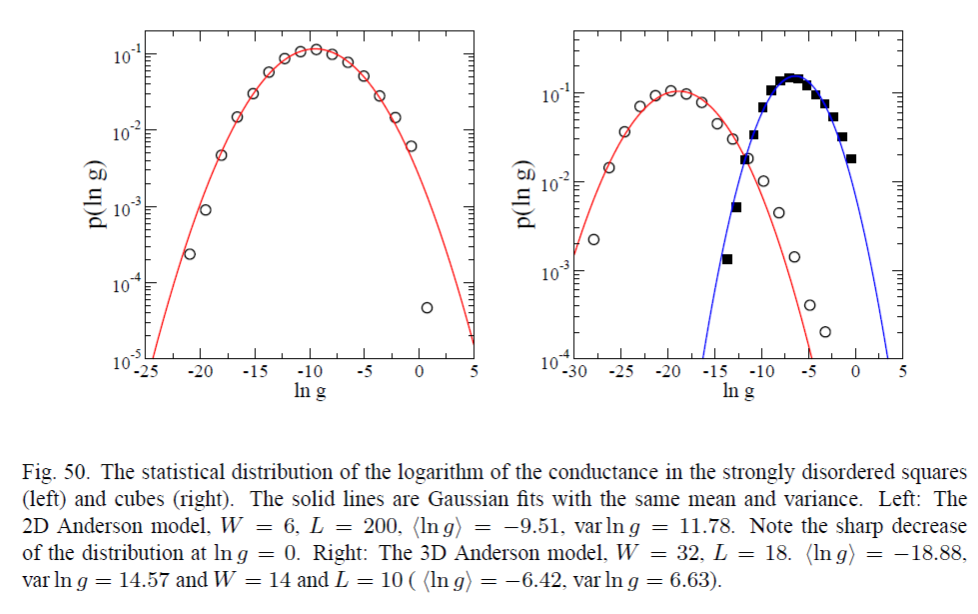


He finds a *narrower* <g>2 in 3D than in Q1D? But his table on previous page says…that <g>2 is larger in 3D than in Q1D. So huh?

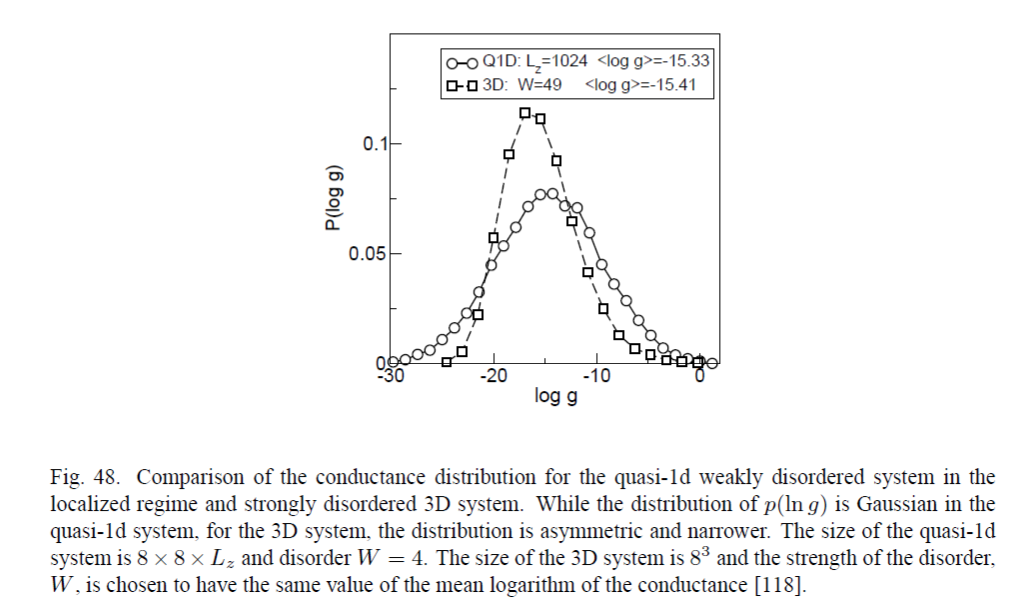


**2D/3D conductors in insulating regime/state**

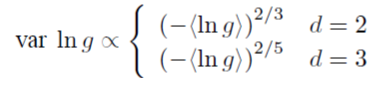
Situation is similar for 2D metals. In the left graph, you can see that p(g) is pretty well log-normal. And while it is, still, <lng>2 evidently doesn’t go linearly with <lng>, as it does in Q1D.



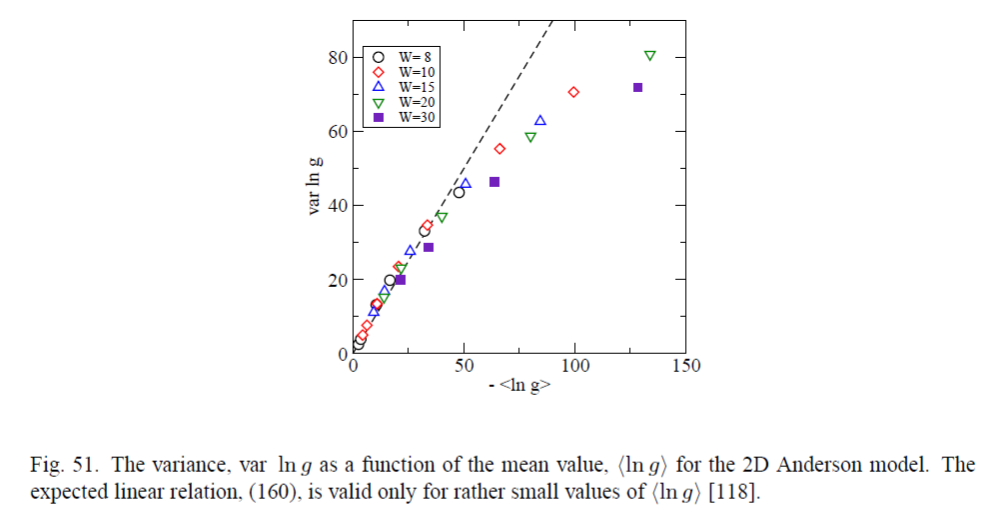
Comparison between Q1D and 3D distribution for same mean <lng>. Can see 3D is narrower, and more asymmetric:



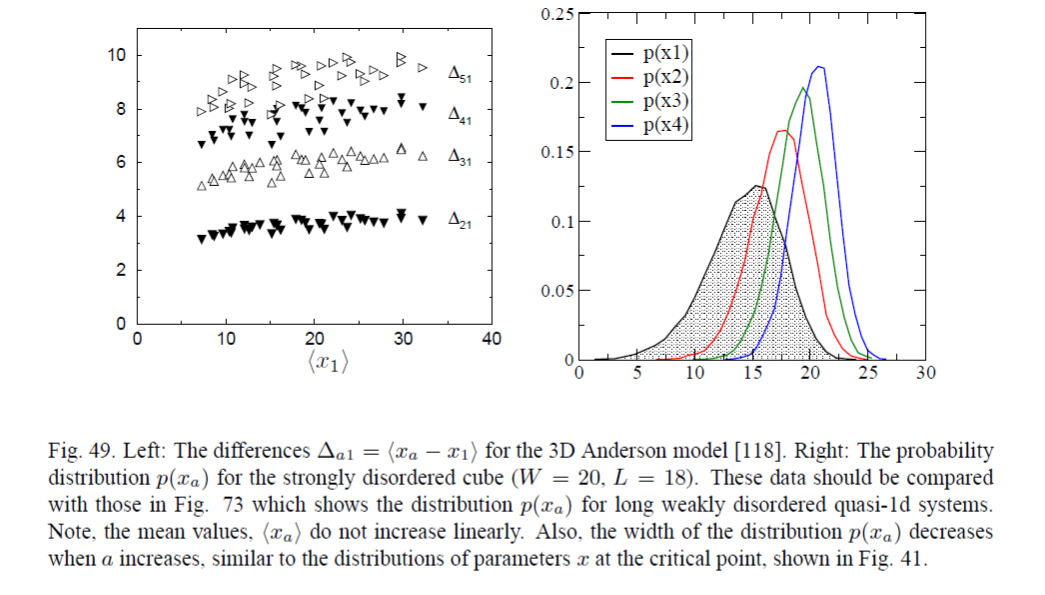
And some <g>2 results are given here:



and here is a visual plot that shows deviations of <lng>2 from Q1D behavior:

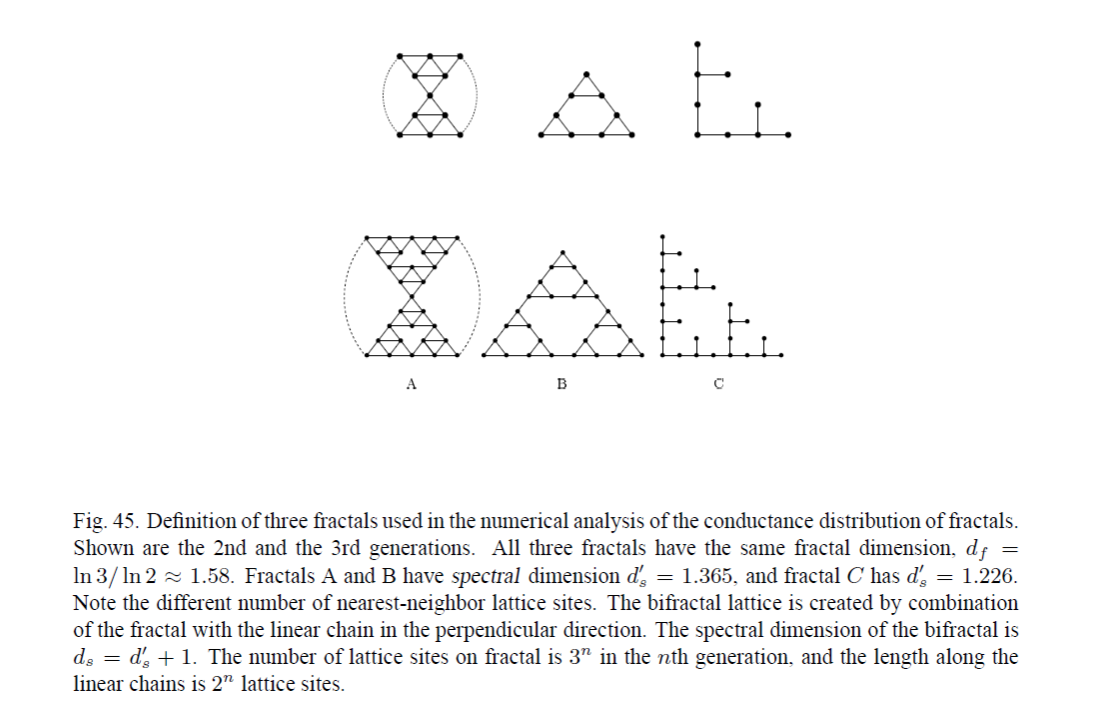


In contrast to weakly disordered Q1D systems, the Lyapunov exponents do not spread out as length increases. Plot to the left gives <xa – x1> as a function of <x1>, and we can see, it’s roughly constant. Probability distributions of the xa are also given. On the right we see that the consequence is that P(lng) is not ln-normal in 3D, though it is in 2D. have <lng>2 vs. <lng>, and can see that although it starts off linear, as in Q1D localized regime, it eventually deviates. Estimates for how <lng>2 depends on <lng> are given below.

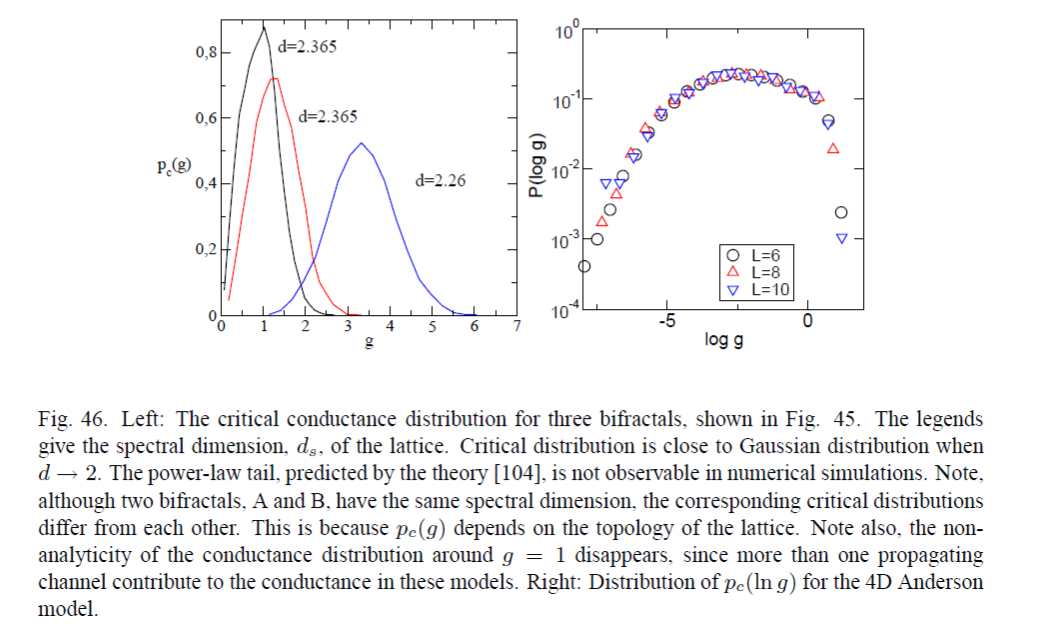


**2+ε conductors at critical point**

One can study the critical distribution in 2+ε dimensions, using a fractal lattice structure. Length independence was again confirmed.

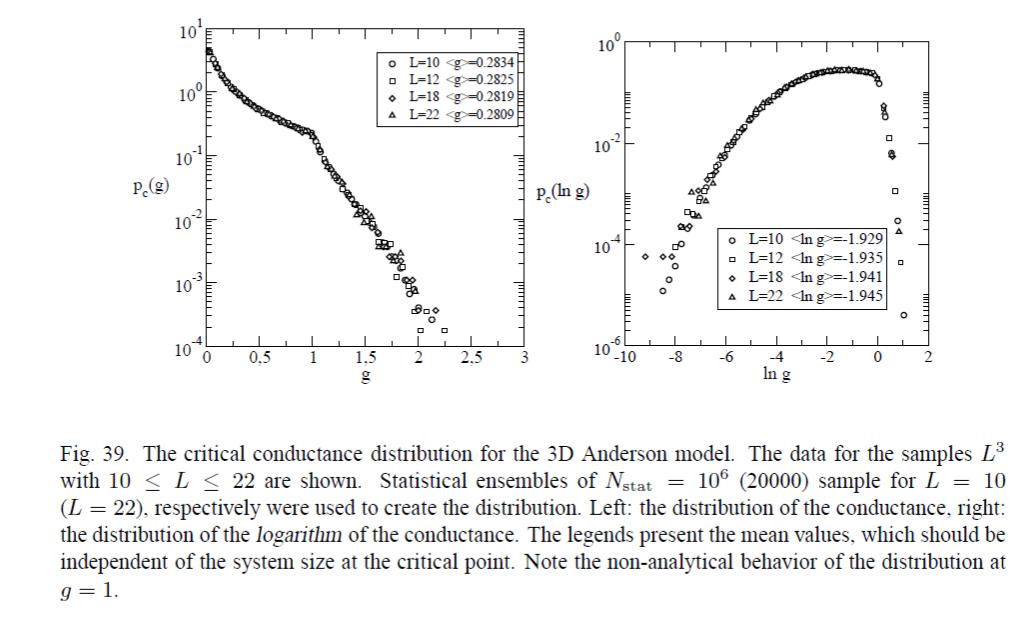


Seems that closer one gets to d = 2, the more a gaussian distribution fits the data. The power law tails predicted by NLsM (via Shapiro), are perhaps too far along the distribution to be observed?

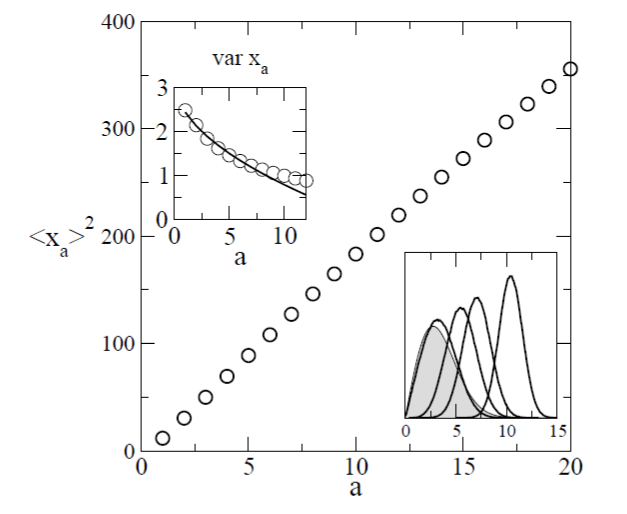


**3d conductors at critical point**

Near the critical point in 3D, we have the following type distribution. It seems to be ln-normal to the left, and exponentially decaying on the right. It manifestly does not appear to have a power law tail, as extrapolation from the NLsM would predict. Note it is independent of size though (at least past a certain length, to be generous…?). But Markos does say while distribution also doesn’t depend on model of disorder, it does depend on lattice structure (weird), and boundary conditions (hard wall, periodic, etc.)



Markos goes on to note that up to some upper index nmax, the Lyapunov exponents are in fixed positions at the critical point (roughly <xa> ~ √a, and <xa>2 ~ 1/√a) which accords with the fact that <g> ought to be invariant. This would suggest that P(g) itself is not necessarily invariant. Or maybe its moments are, up to some max? Of course this would also suggest that g itself is not invariant, technically…?



**Miscellaneous**

Here rough behavior of smallest Lyapunov exponent (3D I think) in various regimes…



This mimicks the expected behavior of K11 (or KNN). In particular, the middle expression looks like this, mimicking the behavior of <g> (in Q1D??):



And here’s a side-by-side plot of Q1D distributions in all regimes, along with plot of numerical solution to DMPK?

