Mon, Jan 6.

Today is the first day of school.

Good SU(2) Tension Result but Bad SU(3) Result

I ran a few things last night. First I solved SU(2) on a 30 by 30 grid, and solved it for R ranging from 1 to 29. Then I did the exact same thing but only on a 10 by 10 grid. The result is very beautiful and the edge effect is surprisingly small, which seems to be too good to be true.

Basically, for both the small and the large grid run (for sU(2)), I got a **strictly** linear relation. This is just way too nice! The slope is very easy to extract in this case. Further more, all the energy almost completely agrees for the small and large grid! This appears to support the claim that there is no edge effect! This is also too good to be true. See the plot below.

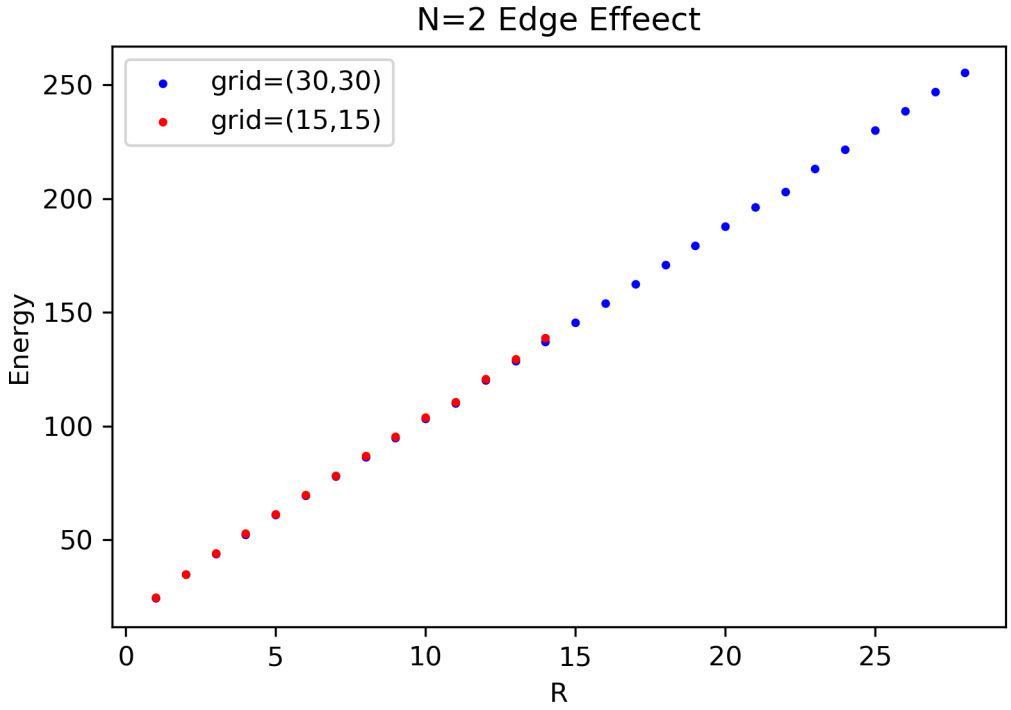

Figure 1: SU(2) Edge Effect Study

However, when I tried to solve the simulation for SU(3), the result just doesn't look right. The middle does not reproduce a vacuum and so the energy does not go to zero in the center. It could be that the convergence is just not finished, or that there is some problem with the equation of motion. I chatted with Andrew and I decided that I will run it for longer tonight and if it still doesn't work, I will do a check of the equation of motion with him tomorrow.

I highly doubt that my code is wrong, because my earlier work used the same basic code and I had the

same deconfinement and baryon result as Andrew. But I am confused by this problem and so I do not trust the too-good-to-be-true SU(2) energy result at the moment (although the SU(2) solution seems right). I wish this can be fixed soon.

Reflection: Christmas List

On December 27, I listed a few important things to do. It was an important list and it occured around Chirstmas, so I will call it the Christmas List. At this point, I think every point there was addressed:

1. All the energy and energy density were taken care of in the Solution Viewer class.
2. The Sigma Critical points class is very sucessful in converting phrase like "x1" and "w1" to numpy array.
3. A proper storage system is implemented, with the key results stored in a core dictionary, and the information and plots are extracted using the solution viewer object whenever desired.
4. I examined the SU(2) solution and they all seem correct. The double string picture emerges, and the fields look similar to Andrew's earlier results.
5. I implemented an Laplacian check, in which after every field configuration is solved, I compare its numerical Laplacian and theoretical Laplacian (by plugging into equation of motion) and compare them side by side. This works very well.
6. After an hour of work, it is clear that it is basically impossible to write down a 2D solution of magnetless solution.

I declare that the Christmas List is resolved.