Jan 29. Wed.

Today is an incredibly productive day!

Finish BPS Initial Grid

I added the capability to take the vertical middle slice of the final solution, and plot it over the initial double BPS solutions. Although a correct solution needs not to overlap with the initial guess (the peak can shift in position), the height of the peaks of the $\vec{\phi}$ and $\vec{\sigma}$ ought to match those of BPS.

In fact, this actually help me figure when a grid is too small for a solution to have a vacuum in the middle. If the BPS solutions look like the end do not have enough space to properly flatten, then this corresponds to a 2D solution with energy in the middle.

Thus, plotting the BPS actually let me tell beforehand whether my separation (and grid) is large enough for the 2D simulation!

Successfully Solved SU(3)

I figured out a general vacua configuration that supports the monodromy of any charge of the form $\vec{w}_a$, and confirm it by solving SU(3). In brief, I make the top half of the inner vacua to be zero, while the bottom half to be $\vec{w}_p$, where $\vec{w}_p$ is the charge of the quark and p is the N-ality. The outside vacua is $\vec{x}_1$. The two domain walls are therefore 1-walls, which are the lowest energy configurations. The solution of this configuration, for two charges separated by a distance of 10 dual photon mass, is shown in figure 1. The potential energy, of the double string picture, is shown in figure 2.

I now declare that SU(3) double string is finally solved! Although I have yet to try it, I have no doubt exactly the same method and the same monodromy supports the result for all N.

What remains to be done now is an edge effect study, before we can start optimizing and mass compute!

Implemented Continue-Solver

This has been on my mind for a long time and I finally implemented it. The old code requires solving from fresh whenever we want to repeat a calculation but with more loops. Now I made an addition to the code such that when this need happens, it takes the previous final result as the starting configuration and add more loops to the simulation.

This is actually a huge time saver for the rest of the project!

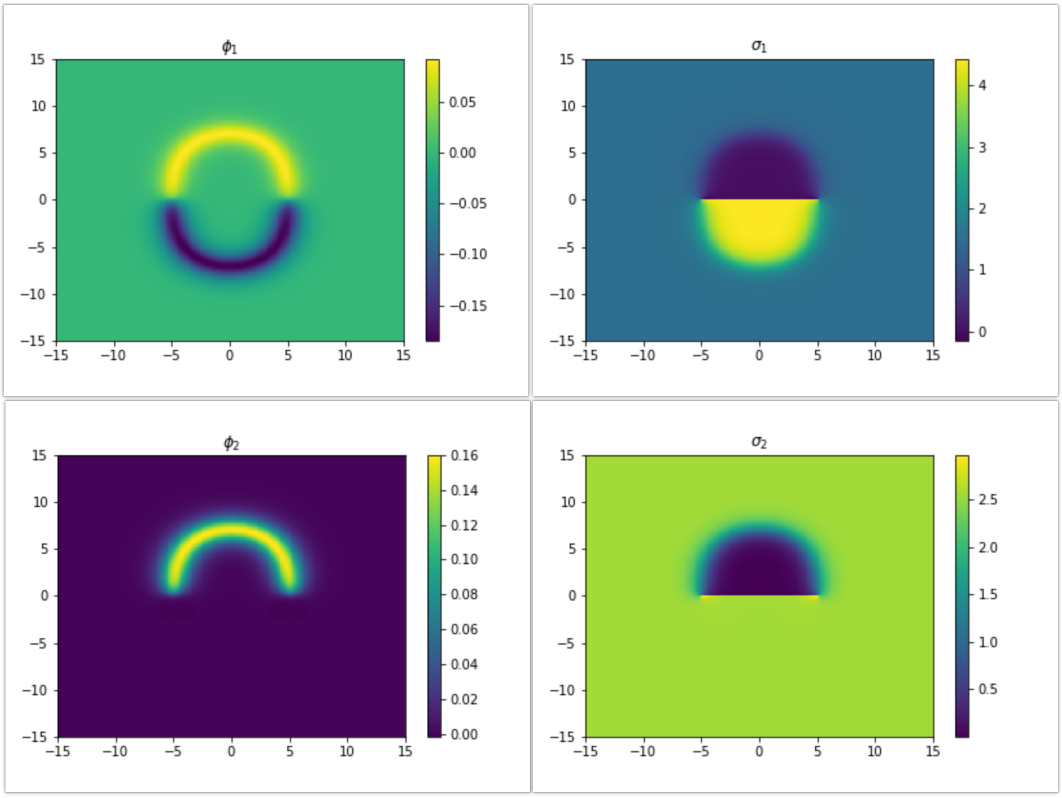

Figure 1: SU(3) Field R=10

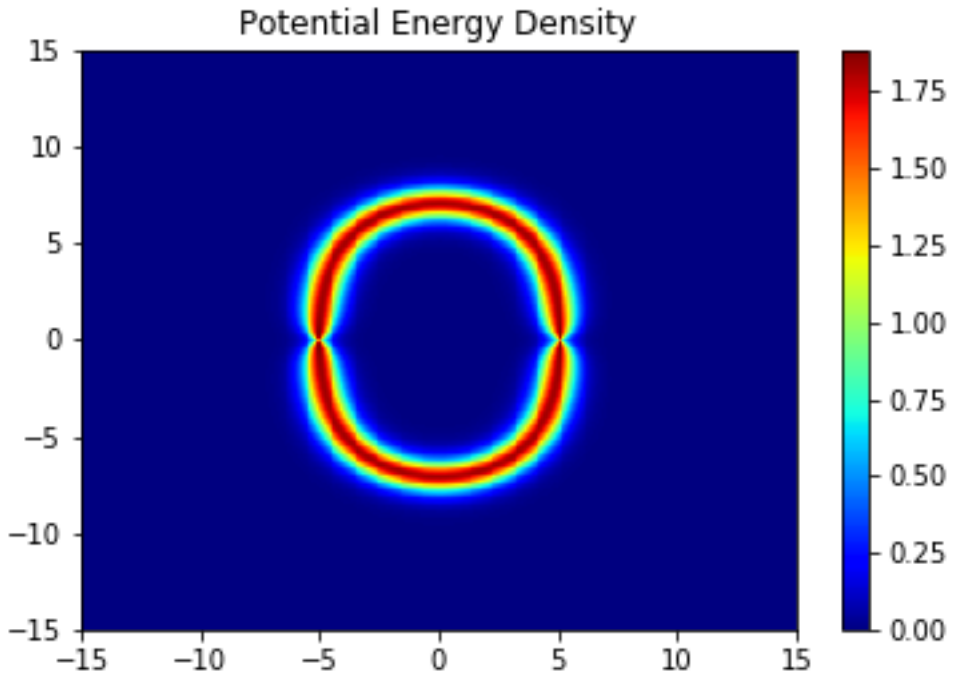

Figure 2: SU(3) Potential Energy Density