

The properties of D1-branes from lattice super Yang–Mills theory using gauge/gravity duality

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We consider 1+1-dimensional maximally supersymmetric Yang–Mills theory (SYM) at large N and strong 't Hooft coupling which is dual to D1 branes. One can have different tori based on the expansion of the gauge links in the moduli space, which is required to target the correct continuum theory. In our previous work, we explored a special skewed torus corresponding to A_2^* geometry. Here, we will restrict ourselves to a rectangular torus and calculate the free energy, equation of state using some known techniques from lattice QCD. This will enable us to evaluate the speed of sound for this strongly coupled plasma. Since there is no shear viscosity in two dimensions, we comment on the expectations for the bulk viscosity from the calculations on the dual gravity side, which unlike the conformal $N=4$ SYM case, does not vanish and is proportional to the trace anomaly.

Primary author: Mr JHA, Raghav Govind (Syracuse University)

Presenter: Mr JHA, Raghav Govind (Syracuse University)

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