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**Steve Zelditch\*** ([zelditch@math.jhu.edu](mailto:zelditch@math.jhu.edu)), Department of Mathematics, Johns Hopkins University, Baltimore, MD 21218. *Large N limit of 2D Yang-Mills on the cylinder.*

The large N limit of 2D Yang-Mills over a Riemann surface M refers to connections on  $SU(N)$  bundles over M. When M is a cylinder, the partition function equals the central heat kernel  $Z(A/N, U_1, U_2)$  for  $SU(N)$  (Migdal's formula). Physicists (D.J. Gross- A. Matytsin, V. A. Kazakov- T. Wynter) have conjectured that  $\frac{1}{N} \log Z(A/N, U_1, U_2)$  has a limit as  $N \rightarrow \infty$ , as long as the eigenvalue distributions of  $U_1, U_2$  tend to limit densities on the circle. We give a counter-example to this conjecture. We also mention some results of Guionnet-Maeda using large deviations methods to prove the conjectured asymptotics for a certain analytic continuation of the partition function; time permitting, we will look at another possible approach to the analytic continuation result. (Received February 07, 2006)