Contribution ID: **71** Type: **poster**

Lattice study of continuity and finite-temperature transition in $2d$ $SU(N) \times SU(N)$ Principal Chiral Model

Monday, 26 June 2017 17:20 (0 minutes)

We present first-principle lattice study of continuity conjecture in $2d$ $SU(N) \times SU(N)$ Principal Chiral Model (PCM) on $\mathbb{R} \times S^1$ with respect to circumference L of S^1 in the presence of $Z(N)$-preserving twist. The twist can be considered as analogous to Twisted Eguchi-Kawai reduction in lattice gauge theory. We study static correlation length and find that it exhibits a peak at finite value of $\rho \equiv NL$, the shape of which shows no dependence on N if considered as a function of ρ. The peak separates two regions: $\rho \to \infty$ where static correlation length matches zero temperature value with periodic boundary conditions and $\rho \to 0$ where it significantly decreases. Without twist we find a signature for large N finite-temperature transition where correlation length demonstrates a peak enhancing with N. Using Gradient flow we study non-perturbative content of the theory and find that this transition sets up at the point where typical size of uniton, unstable saddle point of PCM, becomes comparable to L. After imposing the twist saddle points become stable and effectively $1d$ in the region $\rho \to 0$, whereas in the opposite limit they resemble to $2d$ profile of unitons with periodic boundary conditions. The position of the peak in correlation length with twisted boundary conditions seems to coincide with the moment when $2d$ saddle points transform into effectively $1d$. Our findings suggest possible crossover at finite value of ρ which might have impact on continuity conjecture in twisted PCM.

Primary author: VALGUSHEV, Semen (Regensburg University)

Presenter: VALGUSHEV, Semen (Regensburg University)

Session Classification: Poster session