Index for Ohashi Lecture series

Lecture IV: BPS domainwalls in $U(N)$ gauge Higgs theory

(a) Discrete vacua with non-degenerate mass terms

(b) Bogomol'nyi bound, BPS equations and Killing spinors

(c) The moduli matrix and the master equation

  i. All exact solutions at the strong coupling limit

  ii. Complexified gauge trf.(V-trf)

  iii. $Gr_{N_f,N}(\mathbb{C})$ as a moduli space for BPS domainwalls

(d) Examples for $U(1)$

  i. Center of mass as a Goldstone mode

  ii. Single wall solution

  iii. Position moduli for a multi-wall solution in $\mathbb{C}P^{N_f-1}$

  iv. Topological sector and cell decomposition of $\mathbb{C}P^{N_f-1}$

(e) Example for $U(N)$

  i. patches for the manifold $Gr_{N_f,N}(\mathbb{C})$

  ii. walls for $Gr_{3,1}$ $Gr_{4,2}$

  iii. domainwall solutions and string theory perspective

Lecture V: BPS vortices

(a) A vacuum and BPS equations

(b) The moduli matrix and constraints on the $G^{\mathbb{C}}$ invariant

(c) Semilocal vortex for $G = U(1)$ and lump in NLσM on $\mathbb{C}P^{N_f-1}$

  i. $\pi_2[\mathcal{M}]$ and lump solutions

  ii. scale moduli and small lump singularity

(d) Vortex moduli space $\mathcal{M}_v$ for $G = U(N)$

  i. Fixing V-trf and coordinate patches of $\mathcal{M}_v$

  ii. Transition functions

(e) Local vortex for $G = U(N), N_f = N$

  i. Positions of vortices

  ii. orientational moduli $\mathbb{C}P^{N-1}$ as Goldstone modes

(f) Vortices (lumps) for $G = U(1) \times SO(N)$

  i. Local vortex with a strong condition and orientational moduli

  ii. fractional vortices