

Symmetries of WCW

1. Maximization of symmetries.

- (a) The fundamental symmetries of the theory are isometries of the Kähler geometry of WCW. Kähler function determines the line element and corresponds to Kähler action for preferred extremals having as its 3D ends given 3-surfaces at boundaries of CD. Isometries cannot be symmetries of Kähler action since they would not contribute to the Kähler metric.
- (b) Already in string models the Kähler geometry for loop spaces is essentially unique. Riemann connection does not exist in mathematically respectable manner in infinite-dimensional context unless there exists maximal group of isometries.
- (c) Conjecture: Physics is fixed completely by the Kähler geometric existence of WCW. Infinite-dimensional geometric existence unique and thus also physics.
- (d) Note: basic geometric objects in ZEO are pairs formed by 3-surfaces residing at different light-like boundaries of causal diamond CD. CDs are characterized by moduli space and WCW decomposes to subWCWs associated with CDs.

2. Super-conformal symmetries related to isometries of WCW.

- (a) Guess: isometries of WCW are symmetries of Kähler action for vacuum extremals. Symplectic transformations of $\delta CD \times CP_2$ satisfy this condition. They have structure of conformal group with light-like radial coordinate r of $\delta CD \times CP_2$ taking the role of complex coordinate z . r is not invariant under Lorentz boosts. Hamiltonians can be chosen to be proportional to power r^n of r and n has interpretation as radial conformal weight.
- (b) Symplectic algebra can be extended to super-conformal algebra. The contractions of complexified gamma matrices of WCW with Killing vector fields of isometry generators are good candidates for fermionic superalgebra generators anticommuting to matrix elements of WCW Kähler metric. The outcome is geometrization of fermionic statistics in terms of WCW geometry.
- (c) Physics intuition suggests that WCW gamma matrices are expressible as linear combinations of second quantized oscillator operators for induced leptonic spinor fields contracted with covariantly constant right-handed neutrino spinor mode and integrated over partonic two-surface and involving contraction with symplectic isometry generator for δCD . Flux integral is in question. It does not involve induced metric. This is essential for conformal invariance.
- (d) Besides this one has algebra defined in terms of isometry generators of $\delta CD \times CP_2$ localized with respect to r . Now conserved stringy conformal charges associated with string ends at boundaries of CD are in question and therefore 1D integrals. These generators are labelled by conformal weight associated with spinor modes at string world sheet. This algebra is also a good candidate for isometries of WCW acting on string curves inside 3-surface. It corresponds to subalgebra of symplectic isometries of $\delta CD \times CP_2$. Both fermionic and quark type generators are possible.