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Conformal Fishnet Theory

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I will review the properties and recent results for conformal fishnet theory (FCFT) which was proposed by O. Gurdogan and myself as a special double scaling limit of gamma-twisted N=4 SYM theory. FCFT, in its simplest, bi-scalar version, is a UV finite strongly coupled 4-dimensional logarithmic CFT dominated by planar fishnet Feynman graphs (of the shape of regular square lattice). FCFT inherits the planar integrability of N=4 SYM which becomes manifest in this case: the fishnet graphs can be mapped on the SO(2,4) integrable spin chain (A. Zamolodchikov, 1980). The D-dimensional generalization of FCFT, with SO(2,D) conformal symmetry can be also provided. A remarkable property of FCFT is the possibility of spontaneous symmetry breaking, which is not lifted by quantum corrections. I will also discuss the exact computation of certain anomalous dimensions and 4-point correlators, and of related fishnet Feynman graphs (of "wheel" or "spiral" type), using the quantum integrability tools: asymptotic and thermodynamic Bethe ansatz and quantum spectral curve.

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