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Lattice discretization of 2d integrable quantum field theories from 4d Chern-Simons theory

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The relationship between 2d integrable field theory and 2d integrable lattice models is discussed in the framework of 4d Chern-Simons theory. The 2d integrable field theory is realized by coupling the 4d theory to several 2d surface ordered defects, each defect is then discretized into a 1d defect. We show that the resulting 1d defects are dualized to Wilson lines, and the lattice of discretized defects realizes an integrable lattice model. Our discretization procedure works systematically for a wide class of integrable models (including trigonometric and elliptic models). This is based on a work [hep-th/2309.14412] with Meer Ashwinkumar and Masahito Yamazaki.

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