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Novel Lattice Formulation of 2D Chiral Gauge Theory via Bosonization

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Recently, lattice formulations of Abelian chiral gauge theory in two dimensions have been devised on the basis of the Abelian bosonization. A salient feature of these 2D lattice formulations is that the gauge invariance is exactly preserved for anomaly free theories and thus is completely free from the question of the gauge mode decoupling. In the present paper, we propose a yet another lattice formulation sharing this desired property. A particularly unique point in our formulation is that the vertex operator of the dual scalar field, which carries the vector charge of the fermion and the “magnetic charge” in the bosonization, is represented by a “hole” excised from the lattice; this is the excision method formulated recently by Abe et al. in a somewhat different context.

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