

Abstract Submitted
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Non-chiral Bosonization of Fermions in One Dimension¹ GIRISH SETLUR², Associate Professor, Department of Physics, Indian Institute of Technology Guwahati 781039, India — An alternative to the conventional approach to bosonization in one dimension that invokes the Dirac equation in 1+1 dimension with chiral “right-movers” and “left-movers” is proposed that works directly with the bounded parabolic energy bands relevant to Condensed Matter problems. This technique allows us to use a basis different from the plane wave basis that makes this non-chiral approach ideally suited to study Luttinger liquids that have boundary or impurities that break translational symmetry. We provide a simple solution to the electron Green function for the problem of Luttinger liquid (LL) with a boundary and also for a LL with a single impurity. The present method is significantly easier than the g-ology based standard bosonization and other methods that require a combination of RG along with bosonization/refermionization techniques. Our results are broadly consistent with these more established approaches.

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