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Entanglement entropy in a boundary impurity model GREGORY LEVINE, Hofstra University — Boundary impurities are known to dramatically alter certain bulk properties of $1+1$ dimensional strongly correlated systems. The entanglement entropy of a zero temperature Luttinger liquid bisected by a single impurity is computed using a novel finite size scaling/bosonization scheme. For a Luttinger liquid of length $2L$ and UV cut off ϵ, the boundary impurity correction ($\delta S_{\rm imp}$) to the logarithmic entanglement entropy ($S_{\rm ent} \propto \ln L/\epsilon$) scales as $\delta S_{\rm imp} \sim y_r \ln L/\epsilon$, where y_r is the renormalized backscattering coupling constant. In this way, the entanglement entropy within a region is related to scattering through the region's boundary. In the repulsive case ($g < 1$), $\delta S_{\rm imp}$ diverges (negatively) suggesting that the entropy vanishes. Our results are consistent with the recent conjecture that entanglement entropy decreases irreversibly along renormalization group flow.

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