Probing quantum phase transitions through entropy in boundary-critical models

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In this talk, we focus on the behavior of the boundary entropy in a class of quantum critical models within a dynamical large-N limit, where N is related to the symmetry group of these models. The quantum phase transitions in these models typically defy a description in terms of a Ginzburg-Landau-Wilson functional. We analyze the leading and subleading scaling behaviors of the boundary entropy across these zero-temperature phase transitions and compare the results to expectations based on the g-theorem which relates the boundary entropy to the renormalization group flow. Our findings show that the g-theorem does not apply. This is due to an anomalous contribution to the scaling function in the hydrodynamic regime, which is absent in the quantum coherent regime. We also compare our results with those obtained for the Sachdev-Ye-Kitaev model.

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