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Anomalies and universality in statistical mechanics

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Around 2007 Pierluigi Falco sent me a two line mail writing something like "then we can prove the kadanoff relation $x_- x_+ = 1$". This was the end of a two year discussion between we two (which I will be recall in my seminar)

on the renormalization/non renormalization of the anomalies in quantum field theory and its implications for universality in statistical mechanics; the complete proof of universality relations in non solvable spin models was later on published (Benfatto, Falco, Mastropietro CMP 292, 509 (2009)), and this opened a very exciting research line, crowned to

the proof of universality in the conductivity in Graphene or in the Hubbard model. While the combination

of the properties of anomalies with constructive Renormalization Group seems the right tool to understand universality in equilibrium statistical physics, I will describe some universality results in non equilibrium one dimensional interacting fermions which apparently do not fit in this scheme.

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