High Energy Physics - Theory

Boost modes for a massive fermion field

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We have shown that Wightman function of a free quantum field generates any complete set of solutions of relativistic wave equations. Using this approach we have constructed the complete set of solutions to 2d Dirac equation consisting of eigenfunctions of the generator of Lorentz rotations (boost operator). It is shown that at the surface of the light cone the boost modes for a fermion field contain δ-function of a complex argument. Due to the presence of such singularity exclusion even of a single mode with an arbitrary value of the boost quantum number makes the set of boost modes incomplete.

Comments: 16 pages, 3 figures. In this version the text is essentially rewritten for the sake of clarity and a lot of occasional misprints were corrected

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