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Approximations of relativistic point and delta-shell interactions by regular potentials

We start with a brief exposition of how the one-dimensional Dirac operator with a general point interaction can be approximated by the Dirac operator with either local or non-local regular potential. Then we introduce the two-dimensional Dirac operator with a quite general singular interaction supported on a closed curve and find approximating sequences of operators with regular potentials also in this setting. Finally, a surprising effect of a renormalization of the coupling constant will be briefly discussed and related to the Klein paradox.