Semi-classical asymptotics for Dirac equations in abruptly varying external fields

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We study structure of Lagrangian surfaces, corresponding to semi-classical solutions of Dirac equations. We assume that external electromagnetic field varies abruptly near certain hypersurface in Minkowsky space-time. The main result is asymptotic series for the solution of the Cauchy problem. We prove that the corresponding Lagrangian surface is divided into several parts, corresponding to reflected and transmitted waves. We also discuss the famous Klein effect in non-stationary semi-classical setting. The talk is based on the joint work with Anna Allilueva.