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Solution for the dynamics of the BCS and central spin problems

EMIL YUZBASHYAN, Rutgers University, BORIS ALTSHULER COLLABORATION, VADIM KUZNETSOV COLLABORATION, VICTOR ENOLSKII COLLABORATION — We develop an explicit description of a time-dependent response of fermionic condensates to perturbations. The dynamics of Cooper pairs at times shorter than the energy relaxation time can be described by the BCS model. We obtain a general explicit solution for the dynamics of the BCS model. We also solve a closely related dynamical problem - the central spin model, which describes a localized spin coupled to a “spin bath”. A typical dynamics of the BCS and central spin models is quasi-periodic with a large number of frequencies and stable under small perturbations.

Emil Yuzbashyan
Rutgers University

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