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Short-time dynamics of an ultracold Fermi gas in radio-frequency spectroscopy CHUN KIT CHUNG, C. K. LAW — We formulate the quantum dynamics of radio-frequency (rf) spectroscopy problem of an interacting ultracold Fermi gas by time-dependent variational principle. We consider the initial state as a Bardeen-Cooper-Schrieffer (BCS) state describing pairing between two hyperfine spin levels. An rf field is used to transfer atoms to a third level. Dynamical equations obtained from the variational approach are shown to be derivable from the time-dependent Bogoliubov-de Gennes mean field theory. We show that the short-time dynamics is governed by a set of linear equations, whose spectrum contains a discrete eigenvalue signifying a pair bound state formation in the final scattering channel. Such a bound state causes an oscillation pattern of order parameters in time.

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