2006 Vol.45 No.2 pp.369-372 DOI:

Shot Noise in Ferromagnetic Superconductor Tunnel Junctions

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(Received: 2005-5-30; Revised: 2005-8-1)

Abstract: In this paper, the superconducting order parameter and the energy spectrum of the Bogoliubov excitations are obtained from the Bogoliubov-de Gennes (BdG) equation for a ferromagnetic superconductor (FS). Taking into account the rough interface scattering effect, we calculate the shot noise and the differential conductance of the normal-metal insulator ferromagnetic superconductor junction. It is shown that the exchange energy E_h in FS can lead to splitting of the differential shot noise peaks and the conductance peaks. The energy difference between the two splitting peaks is equal to $2E_h$. The rough interface scattering strength results in descent of conductance peaks and the shot noise-to-current ratio but increases the shot noise.

PACS: 74.40.+k, 74.90.+n
Key words: ferromagnetic superconductor, N/I/FS junction, shot noise, the rough interface scattering

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