STRUCTURE OF FERMION AND BOSON EXCITATIONS IN ONE-BAND HUBBARD MODEL

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S u m m a r y

The Hubbard model in the X-operators representation is studied within the generating functional approach. In the boson sector, Green's functions of two collective excitations, magnons and doublons, are investigated. The equations for them include terms with functional derivatives with respect to the corresponding fluctuating fields of the normal and anomalous components of the electron Green's function. The solution of each equation can be presented through the self-energy and the terminal part which can be calculated by iterations on the electron hopping matrix element. It is shown that, at the half-filling, a Goldstone mode with wave vector $\boldsymbol{Q} = (\pi, \ldots, \pi)$ appears. Expressions for spin and dielectric susceptibility are obtained in the hydrodynamic regime.