A.B. Migdal, *The momentum distribution of interacting Fermi particles*, Sov. Phys. JETP, 333 (1957)

In this JETP paper, *The momentum distribution of interacting Fermi particles*, A.B. Migdal found a general property of the momentum distribution *n (p)* for interacting Fermi particles. It turned out that there exists a jump in this distribution similar to that for non-interacting particles, however, the magnitude *Z* of this jump is less than unity $0 < Z < 1$. The *Z* value determines the weight of quasiparticles on the background of the "bare" non-interacting particles. Migdal himself did not give much significance to this result, but after discussions with and a strong suggestion of L.D. Landau, this work was submitted to JETP. At that time Landau had already published paper [1], where it was assumed that as the interaction between atoms is turned on "gradually", i.e., under a "transition from gas to liquid, the level classification remains unchanged." Then Fermi-liquid theory developed rapidly. Historically, the first works in this field were published in JETP (see, e.g., [2]). In the gas approximation, Fermi system were investigated in [3]. For superfluid Fermi systems, the momentum distribution *n(p)* was found by LP Gor'kov [4]. A microscopic study of the Fermi-liquid theory is given in series of papers [4]. It is interesting to see how perceptions about the impact of the interaction forces on the magnitude of the jump *Z* in the momentum distribution were changing with time. In the first stage, it was thought that the stronger the interaction the smaller is *Z*. Therefore, for nuclei and neutron matter, where the interaction between the particles is strong, the parameter *Z* was expected to be small and the quasiparticle weight is small in comparison with the particle background. Progress in both theory and experiment has led to different results. It turned out that in the nuclear matter gas approximation works well and $Z \approx 0.8$ [6]. The weakness of the effective interactions in nuclei ($1-Z \ll 1$) determines the success of the shell model, awarded the Nobel Prize in 1963. It turned out that quasiparticles and particles are almost indistinguishable in the nuclei.

Nowadays there are various experimental methods for determining the momentum distribution of electrons (e.g., angle-resolved photoelectron spectroscopy), cold atoms in optical traps, etc. But the theory began with a short paper by A.B. Migdal in 1957.

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