Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Ground state spin of a Fermi system with random interactions[1]
VLADIMIR ZELEVINSKY, Michigan State University — Consider a small fermionic system in a spherically symmetric field (external or self-consistent). As an example, atomic nuclei or atoms in a trap can be taken. Let the particles interact through all possible randomly selected but rotationally invariant two-body interactions. The random interaction amplitudes V_L for the channels with all possible angular momenta L of the pair are taken from an ensemble symmetric with respect to the sign of the amplitudes. As a statistical result of many realizations of the ensemble, in spite of the fact that the states with total angular momentum zero appear with a small multiplicity among all many-body states of the system, the system prefers the ground state spin zero with large probability. The probability of the maximum possible spin is also enhanced compared to pure statistical expectations. We discuss underlying physics in relation to ideas of quantum chaos and geometric chaoticity of angular momentum coupling in mesoscopic systems.

[1]Supported by the NSF grants PHY-0244453 and PHY-0555366

Vladimir Zelevinsky
Michigan State University

Date submitted: 17 Nov 2006 Electronic form version 1.4