THEORY OF NONERGODICITY AND NONEQUILIBRIUM PROPERTIES OF STRUCTURAL AND SPIN GLASSES IN QUANTUM CASE

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An explicit form of order parameter in the nonergodicity region of structural and spin glasses in the quantum case is found within the framework of the molecular field approximation. It is shown that the part of the order parameter which does not correspond to intervalley transitions does not experience quantum fluctuations. This property is used to develop a general theory of nonergodicity of structural and spin glasses. A more detailed form of equations is found in the case of a small anharmonism constant for structural glasses of the displacement type. An explicit form of longitudinal and transverse dynamic susceptibilities is found for the structural glasses of the order-disorder type in the case of weak tunnelling. Also a general theory of nonlinear nonequilibrium processes in structural and spin glasses is developed in the quantum case within the framework of the molecular field approximation via the Keldysh technique. The nonequilibrium single-particle distribution function for molecular fields is calculated. The process of long-lived relaxation of the optical spectrum lines in structural glasses of the order-disorder type is described. The three-particle correlation function for a Hesenberg spin glass is calculated.