Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Violating of the Essam-Fisher and Rushbrooke formulas: quantum phase transitions and 1D Ising model[1] VLADIMIR UDODOV, Khakas State Univ, KATANOV KHAKAS STATE UNIV TEAM — The classical Essam-Fisher and Rushbrooke relationships (1963) that connect the equilibrium critical exponents of susceptibility, specific heat and order parameter are shown to be valid only if the critical temperature $T_C > 0$ and $T \to T_C$. For quantum phase transitions (PT's) and 1D Ising model with $T_C = 0K$, these relations are proved to be of different form. This fact has been actually observed experimentally, but the reasons were not quite clear. A general formula containing the classical results as a special case is proposed. This formula is applicable to all equilibrium PT's of any space dimension. The predictions of the theory are consistent with the available experimental data and do not cast any doubts upon the scaling hypothesis.

[1]Author thanks Katanov Khakas State University for support

Vladimir Udodov
Moscow State Univ

Date submitted: 04 Nov 2013 Electronic form version 1.4