

# India-JINR workshop on elementary particle and nuclear physics, and condensed matter research

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## Thermal effects on weak-interaction nuclear reaction under supernova conditions

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The method of superoperators in Liouville space was applied to study equilibrium and excited states of hot nuclei. By the example of selected iron group nuclei and neutron-rich nuclei with  $N \approx 50$ , the influence of temperature on the rates and cross sections for various weak-interaction reactions (electron capture, inelastic neutrino scattering, etc.), which play an important role in the late stages of massive star evolution, was studied. It is shown that thermodynamically consistent incorporation of thermal effects leads to a stronger temperature dependence of the rates and cross sections than predicted by the shell model calculations.

**Primary author:** DZHIOEV, Alan (Joint Institute for Nuclear Research, Bogoliubov Laboratory of Theoretical Physics)

**Presenter:** DZHIOEV, Alan (Joint Institute for Nuclear Research, Bogoliubov Laboratory of Theoretical Physics)

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