

## Natsumi Nagata "Vortex Creep Heating vs. Dark Matter Heating in Neutron Stars,"

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Dark matter particles captured in neutron stars deposit their energy as heat. This DM heating effect can be observed only if it dominates over other internal heating effects in NSs. In this work, as an example of such an internal heating source, we consider the frictional heating caused by the creep motion of neutron superfluid vortex lines in the NS crust. The luminosity of this heating effect is controlled by the strength of the interaction between the vortex lines and nuclei in the crust, which can be estimated from the many-body calculation of a high-density nuclear system as well as through the temperature observation of old NSs. We show that both the temperature observation and theoretical calculation suggest that the vortex creep heating dominates over the DM heating. The vortex-nuclei interaction must be smaller than the estimated values by several orders of magnitude to overturn this.

**Session Classification:** Short talks