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# Heating of Neutron Stars through Scattering and Capturing of Inelastic Dark Matter with Ultra-Relativistic Targets

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Our research focuses on studying the heating mechanism of neutron stars through the capture of inelastic dark matter. Due to the high density of neutron stars, infalling dark matter particles are accelerated to relativistic speeds. To analyze the scattering between ultra-relativistic targets in the neutron star and quasi-relativistic infalling dark matter, we employ relativistic kinematics. This approach enables us to impose strong constraints that were previously unattainable through direct detection and collider searches. Furthermore, we derive an analytic equation for the maximum mass splitting between two species of dark matter

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