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Effect of particle diffusion on damping of neutron star oscillations

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It is believed that the main dissipative agents in oscillating neutron stars are bulk and shear viscosities (the effect of thermal conductivity is known to be weak and can be disregarded). But the internal layers of neutron stars are composed of a mixture of various particle species (neutrons, protons, electrons,...). Then additional, usually ignored, dissipation mechanism can arise, related to particle diffusion in oscillating matter. We study this mechanism in detail and demonstrate that it can compete with the ordinary bulk and shear viscous dissipation under certain circumstances.

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