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Five regimes of fusion reactions in dense stellar matter

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Five regimes of nuclear burning of matter in dense stellar plasma are discussed. They are weakly screening thermonuclear, strongly screening thermonuclear, pycnonuclear, thermally excited pycnonuclear, and intermediate pycno-thermonuclear regimes. The uncertainties of nuclear reaction rates in these regimes are analyzed; astrophysical applications are outlined, with the emphasis on nuclear reactions under extreme conditions in white dwarfs and neutron stars.