

# The Structure and Signals of Neutron Stars, from Birth to Death



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## Role of superfluidity close to the neutron drip line

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Exotic and drip-line nuclei as well as nuclei immersed in a low-density gas of neutrons in the inner crust of neutron stars are systematically investigated with respect to their neutron pairing properties. This is done using Skyrme density-functional and different pairing forces such as a density-dependent contact interaction and a separable form of a finite-range Gogny interaction. Hartree-Fock-Bogoliubov (HFB) and Bardeen-Cooper-Schrieffer (BCS) theories are compared. It is found that neutron pairing is reduced towards the drip line while overcast by strong shell effects. Furthermore, resonances in the continuum can have an important effect counterbalancing the tendency of reduction and leading to a persistence of pairing at the drip line.

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