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Population synthesis of Isolated Neutron Stars

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The neutron star zoo has witnessed a continuous increase in the number of species during the last decades, as more sensitive
instruments were developed, in particular in the high energy band (Fermi-LAT, XMM-Newton, Chandra...). Despite the observational diversity, a consistent theory must be able to explain the different manifestations in terms of different initial conditions or
evolutionary paths. By means of Population Synthesis techniques applied to the population of isolated Neutron Stars, we aim at giving a unified description of
the many faces of neutron stars. These techniques, based on Monte Carlo methods, consist in the simulation of a whole population of sources. Once a population is created, for each evolutionary model, we can look for the optimal parameter combination that reproduces the observed distributions. Despite the numerous uncertainties and the
poor statistics, which results in degeneracy in the parameter space, we show that performing a multiband study of different subpopulations (radio pulsars, X-ray pulsars, gamma-ray pulsars and bursters), some constraints can be obtained.

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