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The effect of inclusion of Delta resonances in relativistic mean-field model with scaled hadron masses and coupling constants

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Knowledge of the equation of state of baryon matter at large densities plays a decisive role in description of neutron star interiors. With an increase of the baryon density filling of the Fermi seas of the hyperons and delta-isobars becomes possible. The inclusion of the hyperons and delta resonances into standard relativistic mean-field models results in a strong softening of the equation of state and a lowering of the maximum neutron star mass below masses of two known pulsars. We extend our recently developed relativistic mean-field model with scaled hadron masses and couplings, and with hyperons, taking into account of delta resonances and we analyze available empirical information to put constraints on the couplings of Δs with meson fields. We show, that with the inclusion of delta isobars our equation of state satisfies the majority of presently known experimental constraints.

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