

Structure of light kaonic nuclei and the equation of state

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In this report, we construct the sensitive correlations between the low-density halo structure and the high-density properties of the nuclear equation of state (EOS) in light kaonic nuclei with the relativistic mean-field theory. More specifically, the $1p_{1/2}$ halo spreads out linearly with increasing the pressure and sound velocity square at supra-normal densities and quadratically with decreasing the incompressibility at saturation density. The sensitivity of the $1p_{1/2}$ halo in kaonic nuclei to the EOS is partially due to the absence of the pseudocentrifugal barrier in the equation for the small component wave function. These results suggest that the novel halo in light kaonic nuclei can serve as a sensitive indicator of the nuclear EOS of symmetric matter at supra-normal densities.