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Strangeness in equation of state studies at high density

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Because of strangeness conservation, strange hadrons are produced in pairs through the so-called associated production. As a result, they have small production cross sections and are also not likely to be destroyed after their production in nuclear collisions. With their relatively large masses, their yields in nuclear collisions at energies below their production thresholds in free space are sensitive to the stiffness of the nuclear equation of state (EOS) at high densities as shown in Ref. [1], where a factor of three difference in the kaon yield is obtained between soft and stiff EOS. This effect had led to the extraction of a soft nuclear EOS from the kaon yield by the KaoS Collaboration from nuclear collisions at subthreshold energies [2,3]. The extension of using subthreshold production of strange hadrons for studying nuclear symmetry energy at high densities was subsequently carried out theoretically for the yield ratios $K^0 K^+$ [4], $\Sigma^- \Sigma^+$ [5], and $\Xi^- \Xi^0$ [6]. In this talk, I will review these results and discuss the challenges in using strangeness for EOS studies at high densities.

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