Antikaons in dense matter at finite temperature

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The antikaon optical potential in hot and dense nuclear matter is studied within the framework of a coupled-channel self-consistent calculation taking, as bare meson-baryon interaction, the meson-exchange potential of the Jülich group [1]. Typical conditions found in heavy-ion collisions at GSI are explored. As in the case of zero temperature [2], the angular momentum components larger than $L = 0$ contribute significantly to the finite temperature antikaon optical potential at finite momentum. It is found that the particular treatment of the medium effects has a strong influence on the behavior of the antikaon potential with temperature [3]. Our self-consistent model, in which antikaons and pions are dressed in the medium, gives a moderately temperature dependent antikaon potential which remains attractive at GSI temperatures, contrary to what one finds if only nuclear Pauli blocking effects are included.
Using a statistical model, we calculate the ratio K^-/K^+ which has been found to be substantially enhanced in the medium [4]. We explore the effect of dressing the antikaons with a spectral function, hence going beyond the usual mean-field analysis.

References

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