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The "K-pp"system investigated with a coupled-channel Complex Scaling Method

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In mesic nuclei, kaonic nuclei have been a hot topic for a decade. Due to so strong KbarN attraction that generates a hyperon resonance Lambda(1405), kaonic nuclei could have various interesting properties, in particular to form a dense matter. To clarify exotic nature caused by anti-kaons, the most essential kaonic nucleus "K-pp"has been studied eagerly from both theoretical and experimental sides. We have investigated the "K-pp" with a coupled-channel Complex Scaling Method + Feshbach projection, treating adequately resonance and coupled-channel natures. Using a chiral SU(3)-based KbarN interaction, we found that the "K-pp"is shallowly bound with 20-30 MeV binding energy, and that it involves the normal density of nuclear matter. Recently, we have pointed out that there could be another state with large binding energy (~80 MeV) involving huge decay width. (Double-pole structure like Lambda(1405)). We will report above-mentioned result and discuss the recent J-PARC experiments of K-pp search (E15 and E27). In addition, we will show a new study with a FULL coupled-channel Complex Scaling Method, where KbarNN, piSigmaN and piLambdaN channels are explicitly treated. Such a fully coupled-channel calculation would tell us more details on the "K-pp"nature, especially on its double pole nature.

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