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The phi-N and phi-nucleus interaction from theory and experiment

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While the phi meson vacuum properties, such as mass and width, are well known, it is not clear how these properties will change once it is put in a dense environment such as nuclear matter.
To study how the phi meson behaves at finite density has been the goal of several past and near future experiments at KEK, COSY-ANKE and J-PARC. Recently, ALICE has obtained novel experimental data constraining the phi-N interaction, at the same time as new lattice QCD calculations about the phi-N potential are also becoming available.
In this talk, I will discuss how these data can be interpreted from a theoretical point of view, and how they possibly can be used to constrain the nuclear matter properties of the phi meson and its longitudinal and transverse polarization modes, which due to the
breaking of Lorentz symmetry in nuclear matter, can be modified differently. I will review theoretical predictions for the in-medium modifications of these quantities and discuss how they could be measured at the future J-PARC E16 and E88 experiments.

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