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Light-meson spectroscopy at COMPASS

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The excitation spectrum of light mesons, which are composed of up, down, and strange quarks, is studied since decades. However, it still holds a number of puzzles and surprises that provide new insights into the nature of the strong interaction.

Recent high-quality data samples from the COMPASS experiment at CERN allow us to not only study the properties of established mesons with unprecedented precision but to also search for new states. These searches aim in particular to resolve the question of the existence of so-called exotic states, such as four-quark states or states with excited gluon fields. Since light mesons have often large widths and are overlapping, the mapping of their spectrum is challenging and requires large quantities of data. The data are analyzed using partial-wave analysis (PWA) techniques. Most excited meson states decay preferentially into multi-particle final states, for which the PWA requires extensive modeling of the dynamics of the final-state hadrons.

In this talk, I will give an overview of the ongoing experimental studies of light mesons at COMPASS. I will also touch on novel analysis techniques and the prospects for future progress.

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