Recent results from the WASA-at-COSY experiment

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WASA is a 4π multidetector system for studies of light meson production and decays in light ion collisions at the COSY storage ring. It allows detection of both photons and charged particles and it uses an internal hydrogen pellet target. The facility is in regular operation for the last three years.

The primary objectives of the experimental programme are tests of symmetries and studies of symmetry breaking patterns in the low energy hadronic interactions and light meson decays. In addition searches and further investigations of specific hadronic bound systems are carried out.

Decays of the of light neutral mesons decays: π^0, η, ω and η' are studied in pd and pp interactions. In the recent $pd \rightarrow {}^3\mathrm{He}\eta$ experiment unbiased, low background sample of 30 million eta decays was collected. It allows for precise tests of Chiral Perturbation Theory. For example in the three pion decays patterns of isospin symmetry breaking are investigated and the determination of light quark mass ratios is possible. The mesons production in pp interactions allows to investigate rare decays due to the larger production cross section. The experiments will provide tests of the fundamental discrete symmetries. The other main experiments involve studies of isospin violation in the $dd \rightarrow \alpha\pi^0$ reaction, studies of the ABC effect and searches for bound states of η and light nuclei.

In the talk an overview of the experimental programme and the recent results will be given. Detailed reports for some of the projects will be presented in the contributed talks to the conference.

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