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Search for physics beyond the SM in meson decays with WASA detector.

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The indirect searches for dark matter particles are a very hot topic of today's physics and astrophysics. The energy-mass content of the Universe is one of the biggest riddles of modern science. The Standard Model describes the physics of only a small fraction of the Universe. Although only gravitational interaction of the dark matter with normal matter was observed up to now, a lot of effort is put by the scientific community into searches for some new interaction between dark and usual matter. This new force would be carried by a new boson and the latter could be seen in the decays of mesons. Most of the scientific research for the effects of dark matter focuses on very high energy physics, still the existence of such effects at lower energy scales is not excluded. Through the analysis of the rare decays of light mesons (eta, neutral pion) WASA collaboration searches for a dark matter signal which cannot be described in the frame of the Standard Model. This effect could be explained by a coupling between a dark boson and Standard Model particles (leptons, photons and/or quarks). The WASA detector is perfectly suited to study leptonic decays for it has the capability to detect both neutral and charged particles and particle identification capacity. The analysis of channels such as $\eta \to e^+e^-\gamma$, $\eta \to e^+e^-$ or $\pi^0 \to e^+e^-\gamma$ will be presented. The data sample with η meson production was collected in proton proton collisions at 1.4 GeV kinetic energy.

Experimental Collaboration

WASA

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