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Searches for dark forces with KLOE

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Recent astrophysical observations are consistent with the existence of a secluded dark gauge sector weakly interacting with the Standard Model. The mass of the mediator, the so called dark photon, or U boson, is predicted to be at the GeV scale. Possible extensions of the minimal model lead to the introduction of a dark Higgs boson which, analogously to its Standard Model counterpart, breaks the gauge symmetry.

These new particles can be observed as sharp resonances in the invariant mass distribution of charged lepton or pion pairs in reactions of the type e+e- –> l(pi)+l(pi)- gamma, in pseudoscalar meson decays or in associate production with a dark Higgs scalar.

KLOE searched for U boson production in phi meson dalitz decays and in e+e- –> mu+mu- gamma reaction,while preliminary results are available for electron positron final state and for the higgstrahlung channel.

No evidence of the process was found and tight upper limits were set to the relevant parameters.

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