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Hadron physics results at KLOE-2

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KLOE and KLOE-2 data (almost 8 fb^{-1}) constitute a unique sample, rich in physics, and the largest dataset ever collected at an electron-positron collider operating at the ϕ peak resonance.
In total it corresponds to the production of about 24 billion ϕ mesons, whose decays include about 8 billion pairs of neutral K mesons and about 300 million η mesons.
A wide hadron physic program, investigating rare meson decays, $\gamma\gamma$ interaction, and dark forces, is thus carried out by the KLOE-2 Collaboration.

The $\eta \to \pi^0\gamma\gamma$ decay is a test bench for various models and effective theories like VMD (Vector Meson Dominance) or ChPT (Chiral Perturbation Theory) which predict BR far from the experimental value. KLOE-2, with its highly pure η sample produced
in $\phi \to \eta\gamma$ process, can give a more refined measurement of this branching ratio.

KLOE-2 continues also its tradition on dark searches testing an opposite model to the U boson or "dark photon", where the dark force mediator is a hypothetical leptophobic B boson that could show up in the $\phi \to \eta B \to \eta\pi^0\gamma\,, \eta \to \gamma\gamma$ channel. The upper limit on the $\alpha_{\rm B}$ coupling constant will be shown.

A KLOE-2 distinctive feature is also the the possibility to investigate π^0 production from $\gamma\gamma$ scattering by tagging final-state leptons from $e^+e^- \to \gamma^{(*)}\gamma^{(*)}e^+e^- \to \pi^0 e^+e^-$ in coincidence with the π^0 in the barrel calorimeter. The preliminary measurement of the $\gamma^*\gamma \to \pi^0$ cross section performed with single-tagged events will be reported.

Moreover, the search for the double suppressed $\phi \to \eta\,\pi^+\pi^-$ and the conversion
$\phi \to \eta\,\mu^+\mu^-$ decays are being performed at KLOE-2 with both $\eta \to \gamma\gamma$ and $\eta \to 3\pi^0$. Clear signals are seen for the first time.

Finally, preliminary and promising results on the ω cross-section measurement in the $e^+e^- \to \pi^+\pi^-\pi^0\gamma_{\rm ISR}$ channel using the Initial State Radiation (ISR) method will be also presented.

In-person participation

Yes

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