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Search for an invisible vector boson from π^0 decays at NA62

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The high-intensity setup, trigger system flexibility, and detector performance –high-frequency tracking of beam particles, redundant PID, ultra-high-efficiency photon vetoes –make NA62 particularly suitable for searching for new-physics effects from different scenarios. We report the results of a search for π^0 decays to one photon and an invisible massive dark photon. From a total of about 400\$ million π^0 decays, no signal is observed beyond the expected fluctuation of the background and limits are set in the plane of the dark photon coupling to ordinary photon versus dark photon mass. The analysis has been also interpreted in terms of the branching ratio (BR) for the electro-weak decay $\pi^0 \rightarrow \gamma \nu \bar{\nu}$: the null result implies a limit on the BR at the level of 2×10^{-7} .

The latest results and the NA62 sensitivity for production and decay searches of Dark Photons, Heavy Neutral Lepton and Axion-Like Particles will be reviewed, together with prospects for future data taking at the NA62 experiment.

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