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Search for the dark photon in π^0 decays

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A sample of 17 million fully reconstructed π^0 Dalitz decays produced in charged kaon decays in flight collected by the NA48/2 experiment at CERN in 2003-04 is analysed to search for the dark photon (A) via the decay chain $\pi^0 \rightarrow \gamma A, A \rightarrow e^+ e^-$.

No dark photon signal is observed, and the most stringent limits on the dark photon mixing parameter in the mass range 9-70 MeV are established. Limitations of the method and possible future directions are discussed.

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