## **EPS-HEP2019**



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## Observation of the rare decay $D^0 \rightarrow K^- \pi^+ e^+ e^-$

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Flavor-changing neutral current (FCNC) processes are rare within the Standard Model (SM) as they cannot occur at tree level and are suppressed at loop level by the Glashow-Iliopoulos-Maiani (GIM) mechanism. In D-meson decays, the GIM cancellation is almost exact, leading to expected branching fractions for  $c \to ul^- l^+$  processes of order  $\mathcal{O}(10^{-9})$ . However, long-distance effects can raise this to  $\mathcal{O}(10^{-6})$ . In this talk, we report on the observation of the  $D^0 \to K^- \pi^+ e^+ e^-$  decay, based on a sample of about 470 fb<sup>-1</sup> of data collected at or near the  $\Upsilon(4S)$  resonance, with the BABAR detector at the PEP II  $e^+e^-$  collider.

We measure  $\mathcal{B}(D^0 \to K^- \pi^+ e^- e^+) = (4.0 \pm 0.5) \times 10^{-6}$  in the di-lepton mass range  $0.675 < m(e^+e^-) < 0.875 \text{ GeV}/c^2$ , where the production of the intermediate state  $\rho \to e^+e^-$  dominates, and set upper limits for decays outside this interval where long-distance effects are expected to be small. The result in the  $\rho \to e^+e^-$  region is consistent with the recent observation of the analogous  $D^0 \to K^- \pi^+ \mu^+ \mu^-$  decay, reported by the LHCb Collaboration.

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