

**Observation of a rare decay of ^{40}K
with implications for fundamental physics and geochronology**

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Potassium-40 is a long-lived, naturally occurring radioisotope. Its various decays to ^{40}Ar and ^{40}Ca affect geochronology and rare-event searches. The KDK (potassium decay) Collaboration has obtained the first experimental evidence for the very rare electron-capture branch from ^{40}K to the ground state of ^{40}Ar [1,2]. This measurement quantifies a previously ill-known background in rare-event searches [3] and resolves a longstanding uncertainty in potassium-based geological age estimates, while also informing the theoretical modelling of highly forbidden weak decays [4].

[1] Stukel et al, <https://doi.org/10.48550/arXiv.2211.10319>

[2] Stukel et al, Nucl. Inst. Meth. in Phys. Res. A 1012 (2021) 165593, <https://doi.org/10.1016/j.nima.2021.165593>

[3] Pradler et al, Phys. Lett. B 720 (2013) 399–404, <http://dx.doi.org/10.1016/j.physletb.2013.02.033>

[4] Hariasz et al. <https://doi.org/10.48550/arXiv.2211.10343>

