Contribution ID: **21** Type: **Parallel talk**

Observation of the $K^+ \to \pi^+\nu\bar{\nu}$ decay and measurement of its branching ratio by the NA62 experiment at CERN

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The $K^+ \to \pi^+\nu\bar{\nu}$ decay is a golden mode for flavour physics. Its branching ratio is predicted with high precision by the Standard Model to be less than 10^{-10}, and this decay mode is highly sensitive to indirect effects of new physics up to the highest mass scales. A new measurement of the $K^+ \to \pi^+\nu\bar{\nu}$ decay by the NA62 experiment at the CERN SPS is presented, using data collected in 2021 and 2022. This new data-set was collected after modifications to the beamline and detectors and at a higher instantaneous beam intensity with respect to the previous 2016–2018 data taking. Using the NA62 data-set from 2016–2022, a new measurement of $\mathcal{B}(K^+ \to \pi^+\nu\bar{\nu}) = \left(13.0^{+3.3}_{-2.9}\right) \times 10^{-11}$ is reported, and for the first time the $K^+ \to \pi^+\nu\bar{\nu}$ decay is observed with a significance exceeding 5σ.

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