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## DICE: A Proposal for Energy-Efficient Electron Acceleration for Nuclear Photonics Applications\*

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Technische Universität Darmstadt is operating the first performant superconducting multi-turn energy recovery linac (ERL) [1]: S-DALINAC. With this technology, the kinetic energy of accelerated electron bunches can be recycled after their usage in a dedicated interaction. The recycled energy is used to accelerate subsequent electron bunches with nearly no externally provided radio-frequency power. Experiments having only little impact on the electron bunches can be served by an ERL, e.g. laser Compton backscattering (LCB), where a laser beam is scattered at an electron beam, which leads to energy-boosted photons. Based on the expertise and experiences of the operation, the team at the Institut für Kernphysik has developed a machine concept of a future ERL called DICE: Darmstadt Individual-Recirculating Compact ERL. This ERL is planned to deliver an electron beam of up to 520 MeV and 20 mA. An LCB setup is intended as an interaction during ERL operation, leading to a quasi-monochromatic brilliant photon beam in the order of a few megaelectronvolts. This photon beam is ideally suited for nuclear photonics applications. In this contribution, we introduce the facility concept DICE and show its conceptual design.

[1] F. Schliessmann, M. Arnold, L. Juergensen, N. Pietralla, M. Dutine, M. Fischer, R. Grewe, M. Steinhorst, L. Stobbe, S. Weih, "Realization of a multi-turn energy recovery accelerator", *Nat. Phys.* 19, 597–602 (2023).

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