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ReLiC: Recycling High-Energy High-Luminosity e^+e^- Collider

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In this talk I will describe a concept of e^+e^- linear collider recycling both the used particles and the used beam energy –the ReLiC. The concept is based on segmenting superconducting (SRF) linear accelerators into sections divided by separators, where used decelerating beams are separated from colliding with accelerating beams by a combination of DC electric and magnetic fields. This design provides for undisturbed straight trajectories of the accelerating beams and on-axis beam propagating both accelerated and decelerated beams in the linac's SRF structures.

In contrast with circular e^+e^- colliders, ReLiC would collide beams only once with disruption parameter typical for linear colliders to boost the luminosity. ReLiC design practically evades synchrotron radiation losses, which limit average beam currents in circular e^+e^- colliders. These novel features would allow to operate e^+e^- collider at c.m. energy from 100 GeV to TeV range, and at luminosity level from $10^{36} \text{ cm}^{-2} \text{ sec}^{-1}$ to $10^{37} \text{ cm}^{-2} \text{ sec}^{-1}$.

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