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Improving the Energy Efficiency of Accelerators

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Modern accelerator driven research facilities reach outstanding performance, but often in coincidence with high energy consumption. On the other hand scarcity of resources and the CO₂ problem give rise to new approaches for energy production, and in all strategies energy efficiency plays an important role. For the public acceptance of large particle accelerator projects, for example the proposed future particle collider facilities, it is thus important to optimize them for best utilization of electrical energy. Within the European accelerator development programs ARIES and EUCARD-2 we organised networking activities, aiming at developing energy efficient technologies for accelerators. This presentation will cover the typical power flow in accelerator facilities, the quantification of efficiency and a number of R&D examples for efficient accelerator systems. This includes magnets, RF power sources, superconducting cavities, heat recovery and energy management.

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