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RF Systems

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Radio-frequency (RF) systems deliver the power to change the energy of a charged particle beam, and they are integral parts of linear and circular accelerators. A longitudinal electrical field in the direction of the beam is generated in a resonant structure, the RF cavity. As it directly interacts with the bunches of charged particles, the cavity can be considered as a coupler to transport energy from an RF power amplifier to the beam. The power amplifier itself is driven by a low-level RF system assuring that frequency and phase are suitable for acceleration, and feedback loops improve the longitudinal beam stability. The spectrum of RF systems in particle accelerators in terms of frequency range and RF voltage is wide. Special emphasis is given to the constraints and requirements defined by the beam, which guides the appropriate choices for the RF systems.

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