Application of RF superconductivity in accelerators

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Application of radio-frequency (RF) superconductivity (SC) in modern accelerators progressed continuously over the last several decades. Superconductivity brings attractive benefits, mainly due to the fact that the surface resistance of a superconductor is many orders of magnitude less than that of normal conductors. A superconducting cavity therefore often yield high quality factor which is hardly achievable for traditional copper cavities. In this presentation, I will discuss the main merits of superconductivity in the resonant cavity. Basics of superconductivity and the working principle of the resonant cavity will be briefly introduced. Then the whole picture of superconductivity in the resonant cavity will be touched. Finally I will discuss several representative factors (power loss, surface peak EM filed, field emission, thermal breakdown, etc.) which influence the overall performance of the resonant cavity in details.


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