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Longitudinal splitting of bunches with variable energies in synchrotron

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The ever-enriching beam application scenarios have put forward more demands on accelerators. With the research and application of multiple energy extraction technology in synchrotrons, how to extract multiple energy bunches in a shorter time has become the next problem to be solved, and it is expected to be applied in tumor radiotherapy. This paper provides three methods for generating short bunches in synchrotron. By adjusting the pulse parameters of the potential well in the induction synchrotron, the short bunches can be easily generated. The short bunches can be kicked out of the beam reference orbit by special equipment such as kicker. When the processes are repeated for many times, and the energy-changing process is added to the time gap during which the short bunches are continuously generated, the short bunches of multiple energy can be extracted in one working cycle. Combined with the analysis of longitudinal dynamics, the number of particles in the short bunches can be better controlled, making an important contribution to further enriching the application scenarios of synchrotron beams.

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Footnotes

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