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Suppression of bunch destruction under resonant excitation of the wakefield

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Acceleration by the wakefield in the plasma can provide compact sources of relativistic electron beams of high brightness. Free electron lasers and particle colliders, using plasma wakefield accelerators, require high quality bunches with predictable profile. Previous studies showed that the resonant sequence of electron bunches appears to be unstable due to the destruction of the bunches. In this paper we discuss the mechanism of this destruction due to the focusing field phase shift which appears during this time evolution. We numerically and analytically showed the possible way of suppressing this instability, shifting all bunches on some distance.

Footnotes

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