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## **Bunch lengthening by a third-harmonic cavity in a low-emittance ring**

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A common feature in the design of low-emittance lattices is the small momentum compaction, which implies a short nominal equilibrium bunch length. A short bunch length can lead to beam-induced heating of the storage ring vacuum components, and, combined with the small transverse emittances, can degrade the beam quality and pose severe limitations on the beam lifetime. To mitigate the aforementioned issues and improve the lifetime and quality of the beam, a common procedure is to use a higher-harmonic cavity (HHC) system, which leads to an increase of the equilibrium bunch length without an increase of the energy spread. An important issue in the design of an HHC system is the proper choice of the multi-bunch configuration and the HHC parameters, both in terms of HHC performance limitations and beam stability. In this contribution we discuss numerical simulations of HHC effects, with parameters of a 3HC system for the NSLS-II low-emittance upgrade, addressing both beam stability and the performance limitation due to a gap in the uniform multi-bunch configuration.

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### **Footnotes**

### **I have read and accept the Privacy Policy Statement**

Yes

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