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Digital direct feedback at ALBA for beam loading mitigation

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A digital direct RF feedback (DDRF) has been implemented in the DLLRF of the ALBA synchrotron light source in order to mitigate the beam loading effects of the beam. Specifically, with the DDRF implemented in the main cavities, the tune shift due to beam loading can be minimized and therefore the DC-Robinson instability can be mitigated. It can also be used to minimize voltage drops in case of transients after a cavity loss during the operation. Also, for the next generation machine ALBA-II and applied to the active 3rd harmonic system, it can be used to fight against AC-Robinson instability induced by the harmonic cavities, increasing the damping rate of the fundamental CBI mode, and reducing the transient beam loading effects. In this contribution we present measurements with beam of the DDRF applied to ALBA main cavities, demonstrating a reduction of a factor two in the effective impedance of the cavity as seen by the beam.

Footnotes

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Paper preparation format

LaTeX

Region represented

Europe

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