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## Compensation of third-order resonances in the presence of strong space-charge effect

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Resonance crossing, jointly determined by a large space-charge tune spread and magnetic field errors, is the main cause of beam loss and emittance growth in HIAF-BRing. For weak beams, the classical theory based on the resonance driving terms (RDTs) allows a perfect resonance compensation through precisely pre-known nominal TWISS parameters. As the space-charge gets intensified, however, the phase shift and beam envelope of particle's betatron oscillations are significantly modulated, which may lead to an inaccurate estimation on RDTs and hence an ineffective compensation. In this talk, a comparison will be made on the efficiency of a simultaneous compensation of multiple third-order resonances for two cases, (i) using nominal optics and (ii) considering the space-charge modulation on TWISS parameters, by numerical simulations. Besides, a procedure will be outlined for resonance compensation experiments in BRing, and a discussion will be given on how to apply the space-charge modulated TWISS in practical situations.

### Footnotes

### Funding Agency

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

Yes

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