



Contribution ID: 2029 Contribution code: TUPA190

Type: **Poster Presentation**

The double drift harmonic buncher (DDHB) and acceptance investigations at linac and cyclotron injections

Tuesday, 9 May 2023 16:30 (2 hours)

Particle accelerators demand high particle transmission and reduced longitudinal emittance; hence, effective bunching systems are requested. The concept based on an efficient, compact design called “Double Drift Harmonic Buncher - DDHB” fulfills these two requirements for a c.w. or pulsed beam injection into an RFQ, a DTL, or a cyclotron. The proposal is associated with two buncher cavities separated by a drift space and an additional drift at the end of the system for a longitudinal beam focus at the entrance of the next accelerator unit, whose candidates can be one of those mentioned above. The investigations are focused on exploring accurate acceptance rates. To obtain successful and understandable outputs from the DDHB concept, a new multi-particle tracking beam dynamics code called “Bunch Creation from a DC beam - BCDC” has been developed for detailed investigations of space charge effects. It allows to calculate the transformation of intense dc beams into particle bunches in detail with a selectable degree of space charge compensation at every location. This paper presents the results from various investigations with and without space charge effects.

Funding Agency

Footnotes

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Yes

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Session Classification: Tuesday Poster Session

Track Classification: MC4: Hadron Accelerators: MC4.A08: Linear Accelerators