



Contribution ID: 249

Type: **Poster**

Experimental demonstration of cascaded round-to-flat and flat-to-round beam transformations at the Argonne Wakefield Accelerator Facility

Tuesday, 23 July 2024 18:00 (1h 30m)

Flat and magnetized beams are special beams to be used for increasing luminosity of the colliders and cooling of hardon beams, respectively. Magnetized beam generated by the photoinjector with non-zero magnetic field at the cathode can have high relativistic factor larger than 50 to be applicable for high-energy hadron beam cooling. Thus, it is hard to transport using conventional solenoid magnet. The idea of magnetized beam transport is that we remove the coupling terms of the beam by using skew triplet, enabling to transport it using normal quadrupole magnets. After the skew triplet, transverse coupling is removed, but the transverse emittance becomes associated with the original magnetization, leading to the large emittance ratio between horizontal and vertical planes. This is called flat beam. Then, using another skew triplet, flat beam can be transformed back to the round, magnetized beam for the actual application. We performed the experimental demonstration of round-to-flat and flat-to-round beam transformation at the Argonne Wakefield Accelerator (AWA) Facility. In this study, we present the experimental data analysis compared to the particle tracking simulation results. In addition, we also show the discussions on the flat-to-round beam transformations such as beam shape, FRBT condition and experimental considerations.

Working group

WG5 : Beam sources, monitoring and control

Primary authors: CHEN, Gongxiaohui; KIM, SEONGYEOL (Pohang Accelerator Laboratory); PIOT, Philippe (Argonne National Laboratory); DORAN, Scott (ANL); LIU, Wanming (ANL); WHITEFORD, Charles (Argonne National Laboratory); WISNIEWSKI, Eric (Argonne); POWER, John (Argonne National Lab)

Presenter: CHEN, Gongxiaohui

Session Classification: Poster [Atrium]