



Contribution ID: 1484 Contribution code: MOPS07

Type: **Poster Presentation**

## Classification of potentials for self consistent symplectic space charge

*Monday, 20 May 2024 16:00 (2 hours)*

A general theory of symplectic tracking under the influence of space charge force is not yet available, even if some specific solution was proposed [1, 2]. In this paper we will first review how the pull-back of the Lie transform can be used to self-transport the beam distribution and its associated electromagnetic potential under the effect of the space-charge. We will then classify the functions suitable for an iterative algorithm with the Lie transform. Those functions will be used to describe the electromagnetic potential of the space charge.

### Footnotes

- [1] J. Qiang, "Symplectic multiparticle tracking model for self-consistent space-charge simulation," Physical Review Accelerators and Beams, vol. 20, no. 1, p. 014203, 2017.
- [2] E. Laface and J. Esteban Müller, "Self-consistent space charge tracking method based on lie transform," in 8th Int. Particle Accelerator Conf., Copenhagen, Denmark, 2017, pp. 4454–4457.

### Funding Agency

### Paper preparation format

LaTeX

### Region represented

Europe

**Primary author:** LAFACE, Emanuele (European Spallation Source ERIC)

**Presenter:** LAFACE, Emanuele (European Spallation Source ERIC)

**Session Classification:** Monday Poster Session

**Track Classification:** MC5: Beam Dynamics and EM Fields: MC5.D02 Nonlinear Single Particle Dynamics Resonances, Tracking, Higher Order, Dynamic Aperture, Code Developments