Report on the outcomes of a Short-Term Scientific Mission[1]

Action number: CA18232

Grantee name: Thomas Borsoni

Details of the STSM

Title: Long time behaviour of solutions to the Nordheim equation for fermions

Start and end date: 08/10/2023 to 13/10/2023

Description of the work carried out during the STSM

We improved the result on which our work is based on (entropy dissipation-entropy inequality) so that more cases will be covered. We adapted our previous work to more physical cross-sections of the fermionic case, allowing its velocity part to be controlled by different power laws as the relative velocity is small or high, instead of being equal to one power law. We concluded the proof of the L^{∞} bound, independent in the quantum parameter. Since we consider more physical cross-sections, we investigated how the proof for the Maxwellian lower-bound would be affected. Also, to obtain exponential instead of polynomial convergence, we started investigating the linearized operator and a strategy to obtain a spectral gap.

Description of the STSM main achievements and planned follow-up activities

Description and assessment of whether the STSM achieved its planned goals and expected outcomes, including specific contribution to Action objective and deliverables, or publications resulting from the STSM. Agreed plans for future follow-up collaborations shall also be described in this section.

As stated earlier, we refined our results and widened the spectrum of our convergence to equilibrium result to more initial data, and more physical cross-section. We almost concluded - to the exception of the lower-bound, for which we have a strategy - the first part of our work, which proves polynomial convergence to equilibrium; the first quantitative result on the long-time behaviour of solutions to the Nordheim equation for fermions, which will contribute to the Task 4 of Working Group 2. We are currently working on making this result an article, and have written the majority of the proof. In the future, we intend to work together on the linearized operator, which will provide exponential convergence to equilibrium.

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[1] This report is submitted by the grantee to the Action MC for approval and for claiming payment of the awarded grant. The Grant Awarding Coordinator coordinates the evaluation of this report on behalf of the Action MC and instructs the GH for payment of the Grant.

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