Simulation for 2024 paper using Julia

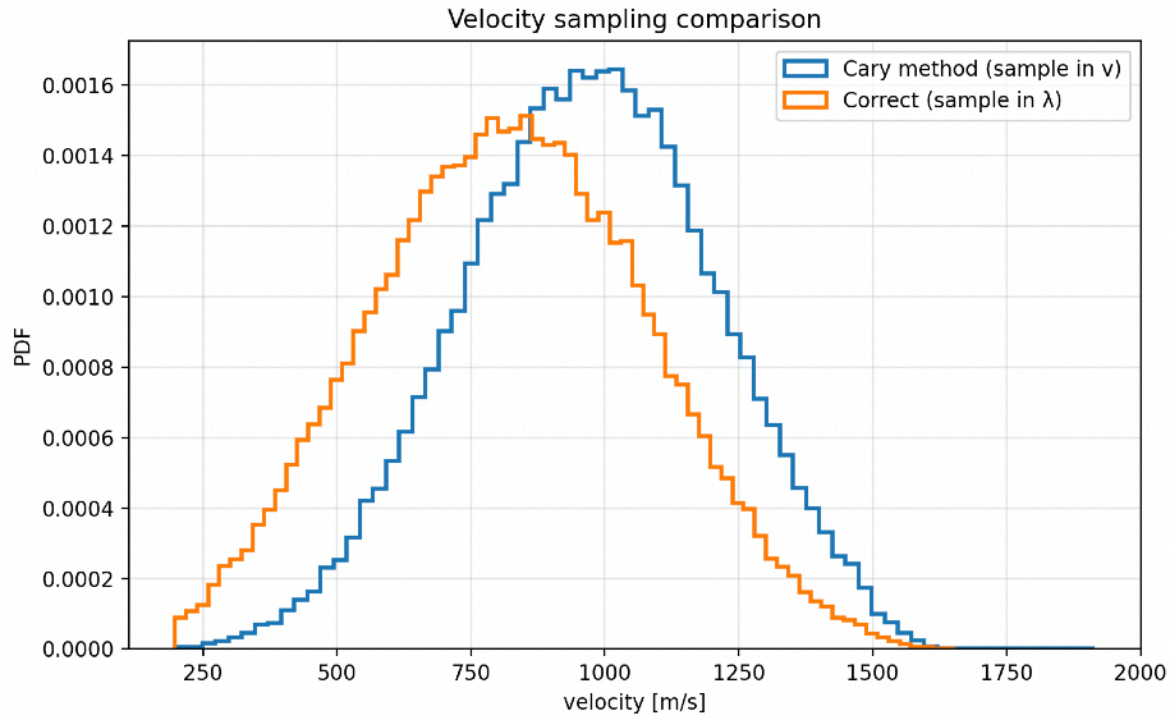
2026-02-10

linus.persson@fysik.lu.se

LUND UNIVERSITY

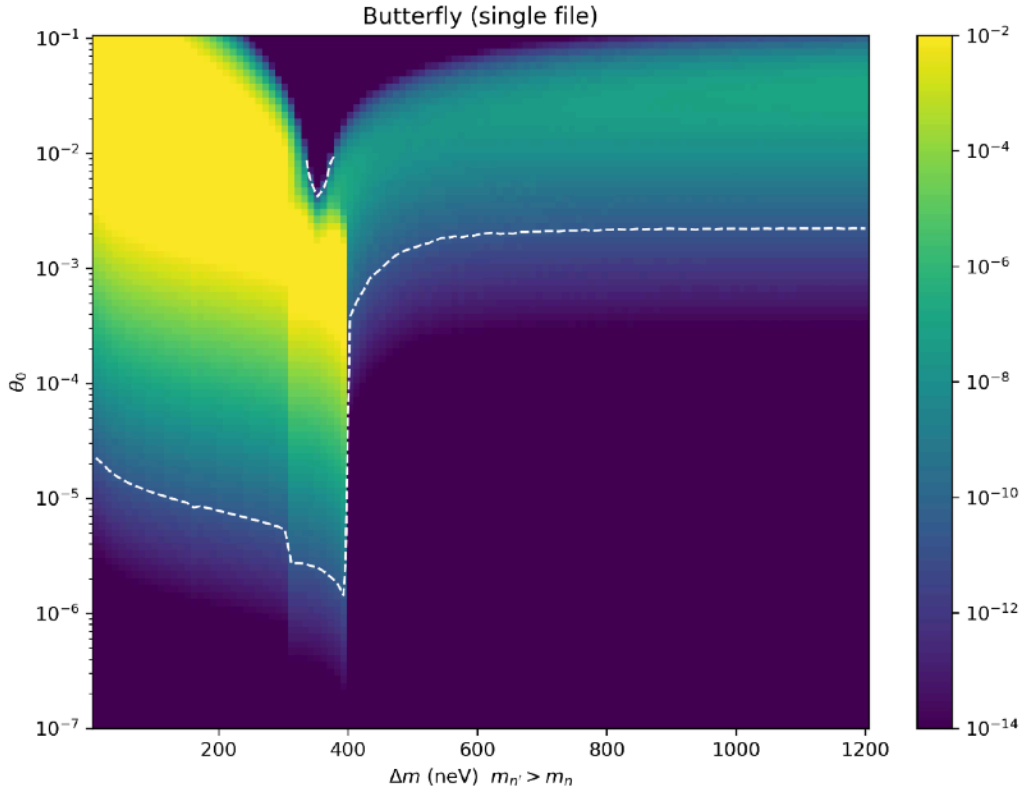
Update on butterfly plot calculation

- Julia simulations run on COSMOS (Lund University cluster), full simulation (2000 velocities) takes ~5 hours for positive masses, assuming available nodes. Need to reduce file size for final simulation to prevent OOM error.
- Confirmed that Julia code sampled velocities incorrectly. New implementation consistent with Nathan.



Example of butterfly plot

- Note, this simulation is with wrong Cd thickness (3.5 cm) and old velocity spectrum. New simulation is queued to be run.
- LU has NVIDIA computers I can use for local test runs, will need to get account which will take ~days.



Current/ongoing work

- Fixed velocity spectrum sampling in Julia code (https://github.com/CaryRock/Kline_Julia/tree/lund).
- Changed magnetic field definition, now uses absolute magnetic field values provided in .csv file instead of old procedure (normalised shape, scaled by parameter). Uses cubic Hermite instead of exponential for the tails of the field.
- Hopefully new results by end of the week.
- **Strategy**: Compare results for positive (large) Δm with Nathan. Once agreement is reached, move on to compute smaller Δm and extract plots.

LUND UNIVERSITY