Status Report

Tsuchii Ryotaro

Kuze Laboratory

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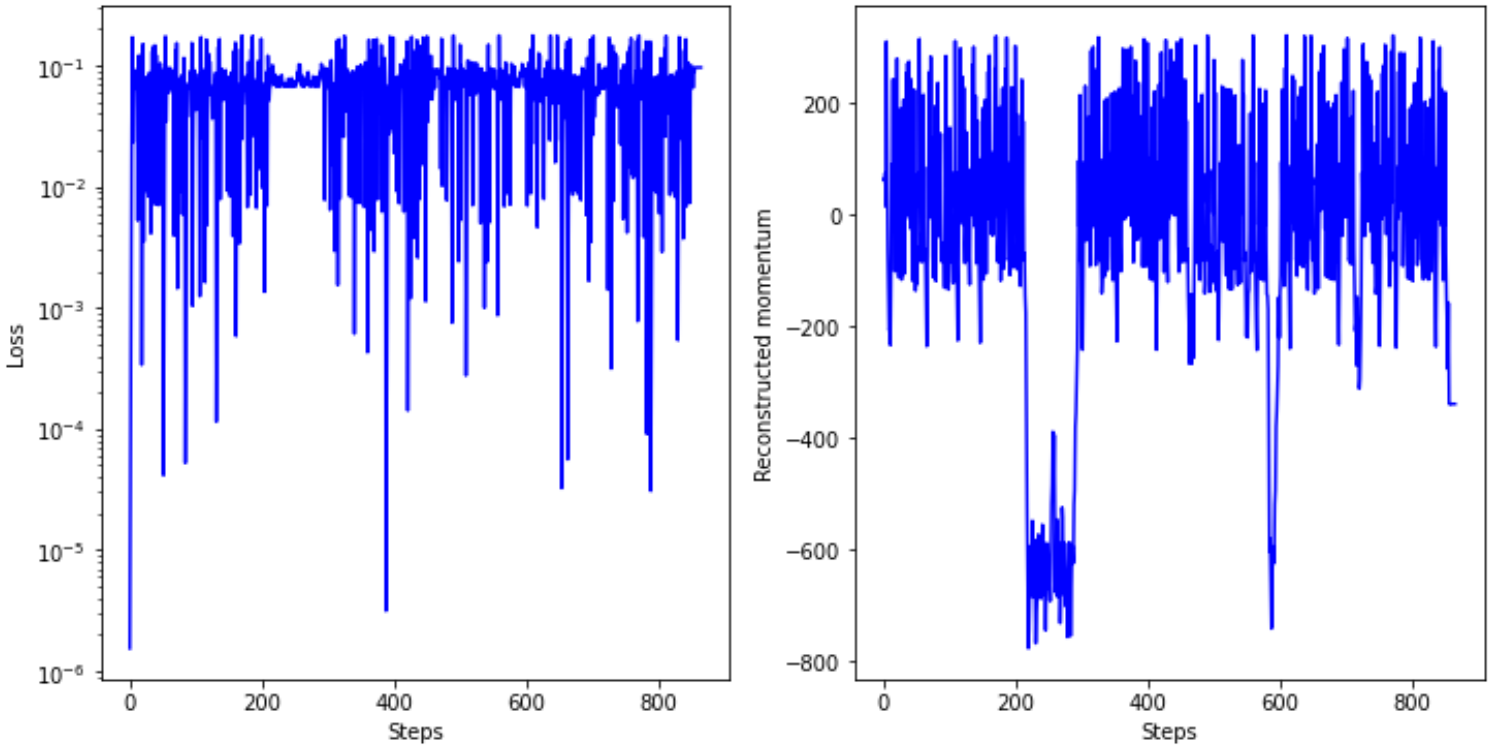
momentum reconstruction

- For low momentum ($< 100\ \mathrm{MeV}/c$), my reconstruction algorithm does not work well.
- I checked the step v.s. loss (reconstructed momentum) plots of low momentum samples.

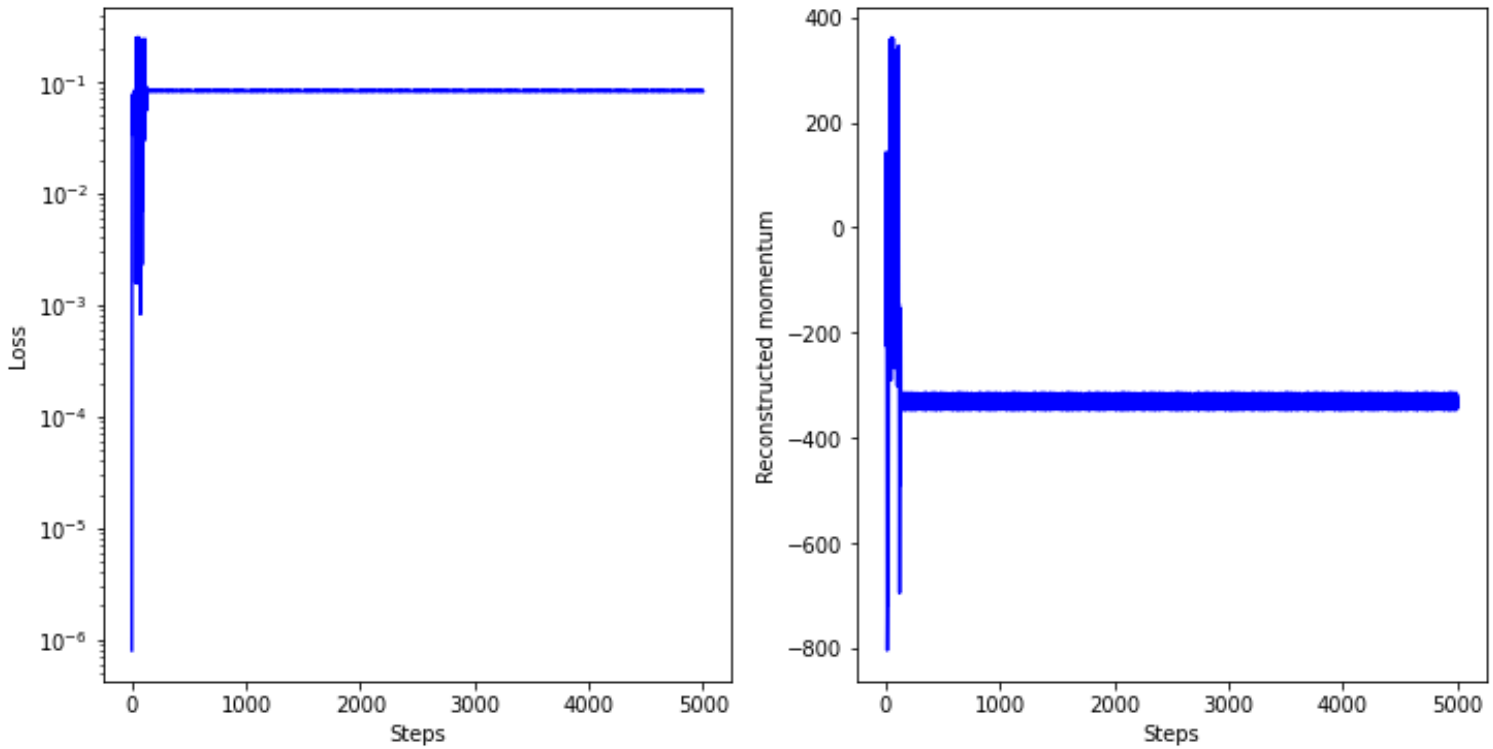
momentum reconstruction



fakedata (true momentum: $63.6\ \mathrm{MeV}/c$)

- the lowest loss of this sample is 1.55×10^{-6} ($64\ \mathrm{MeV}/c =$ initial value).
  - I decide initial momenta by loss surface.

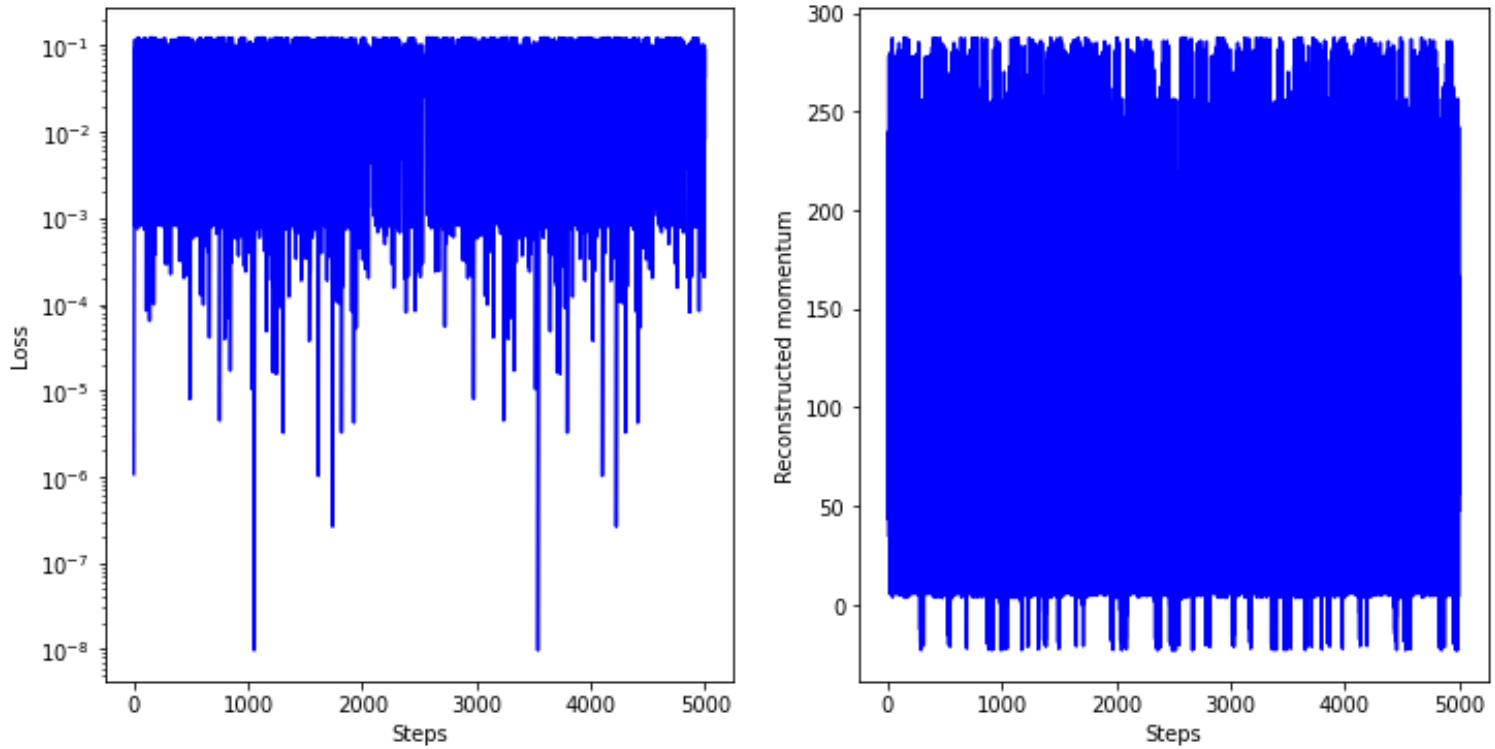
momentum reconstruction



fakedata (true momentum: $51.8\ \mathrm{MeV}/c$)

- the lowest loss of this sample is 1.55×10^{-6} ($52\ \mathrm{MeV}/c =$ initial value).

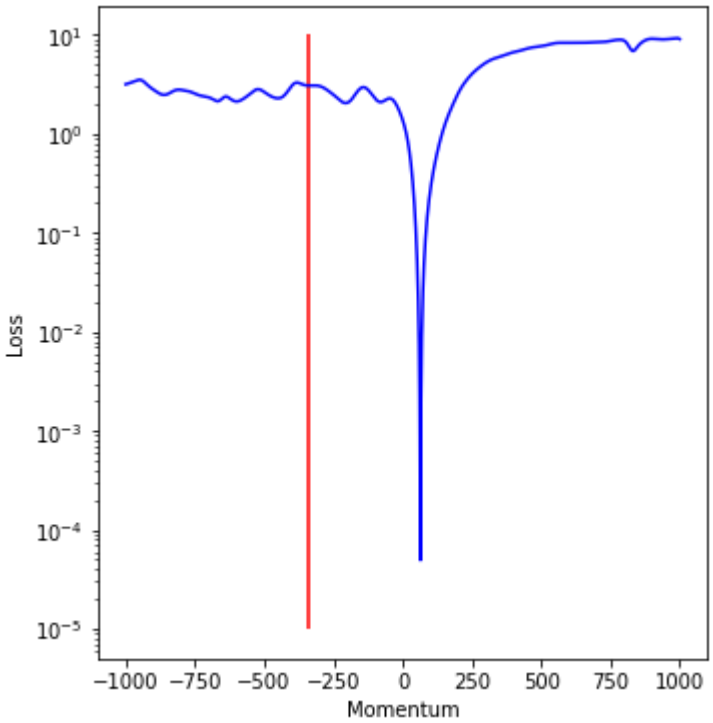
momentum reconstruction

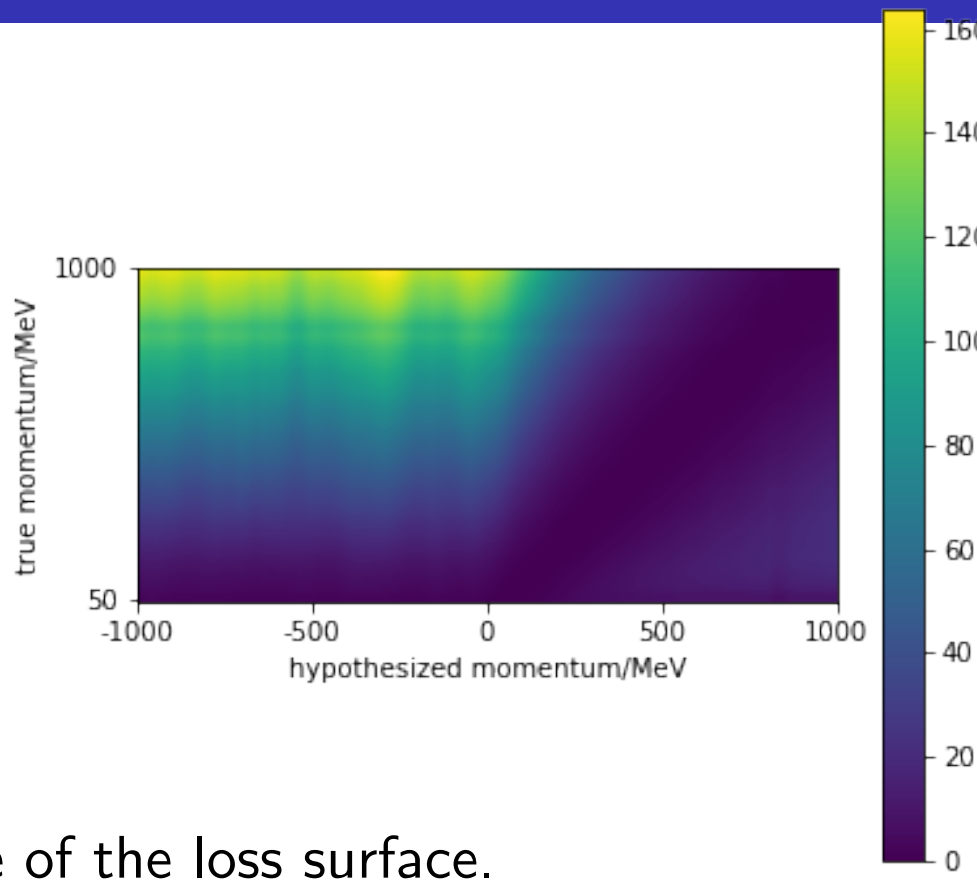


fakedata (true momentum: $78.4\ \mathrm{MeV}/c$)

- the lowest loss of this sample is 9.66×10^{-9} ($78.4\ \mathrm{MeV}/c$ (not initial momentum).
  - loss is very oscillating.
- There are patterns of negative momentum output and oscillating losses.

momentum reconstruction





- I checked momentum dependence of the loss surface.
  - Loss surfaces for fakedata of $50,\ 51,\ 52,\ \cdots 1000\ \mathrm{MeV}$ were made into 2D plot (X: hypothesized momentum, Y: true momentum, Z: loss).
- For low momentum samples, the loss values tend to be small.
  - Because the loss values are small, the learning rate can easily become too large for the loss and optimization does not work well.

momentum reconstruction

- ToDo:
  - Adjust the learning rate (and limit output to positive value).