Coherent Space Charge modes: GALACTIC vs. BimBim

In blue: Water-Bag bunch, Linear RF, no radial modes

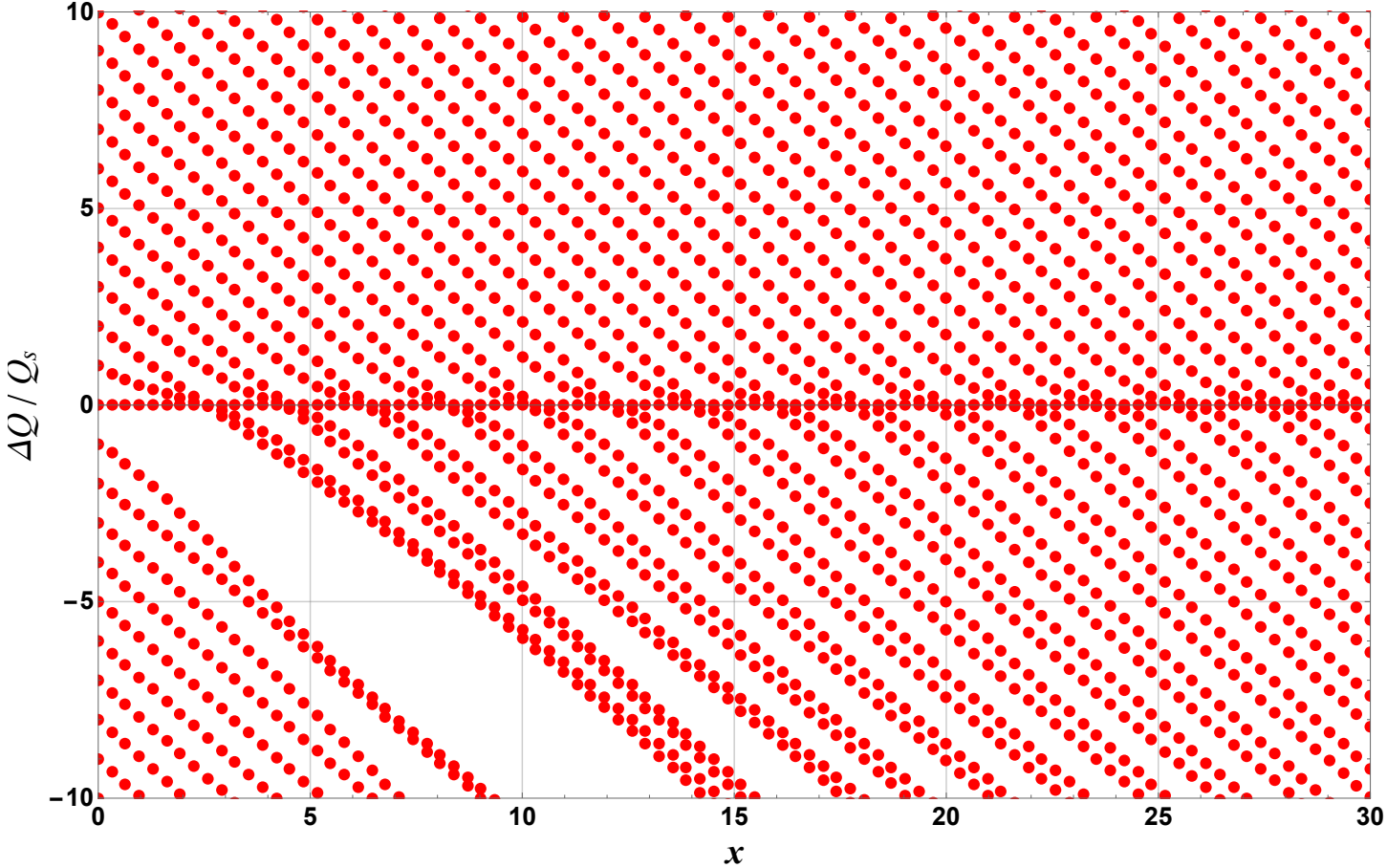
EliasM and (vs. ;-)) XavierB

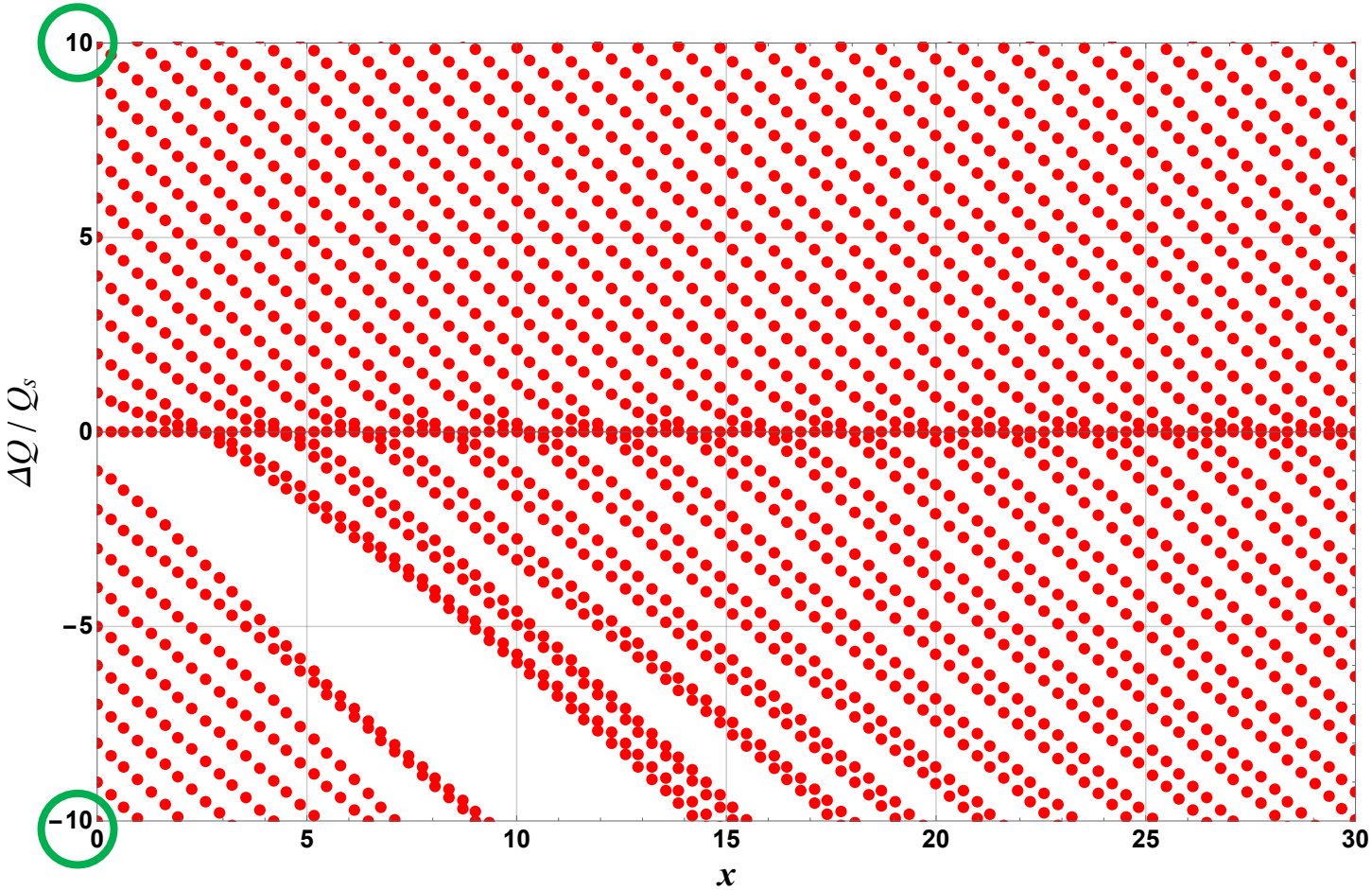
In red: Gaussian bunch, Linear RF, no radial modes

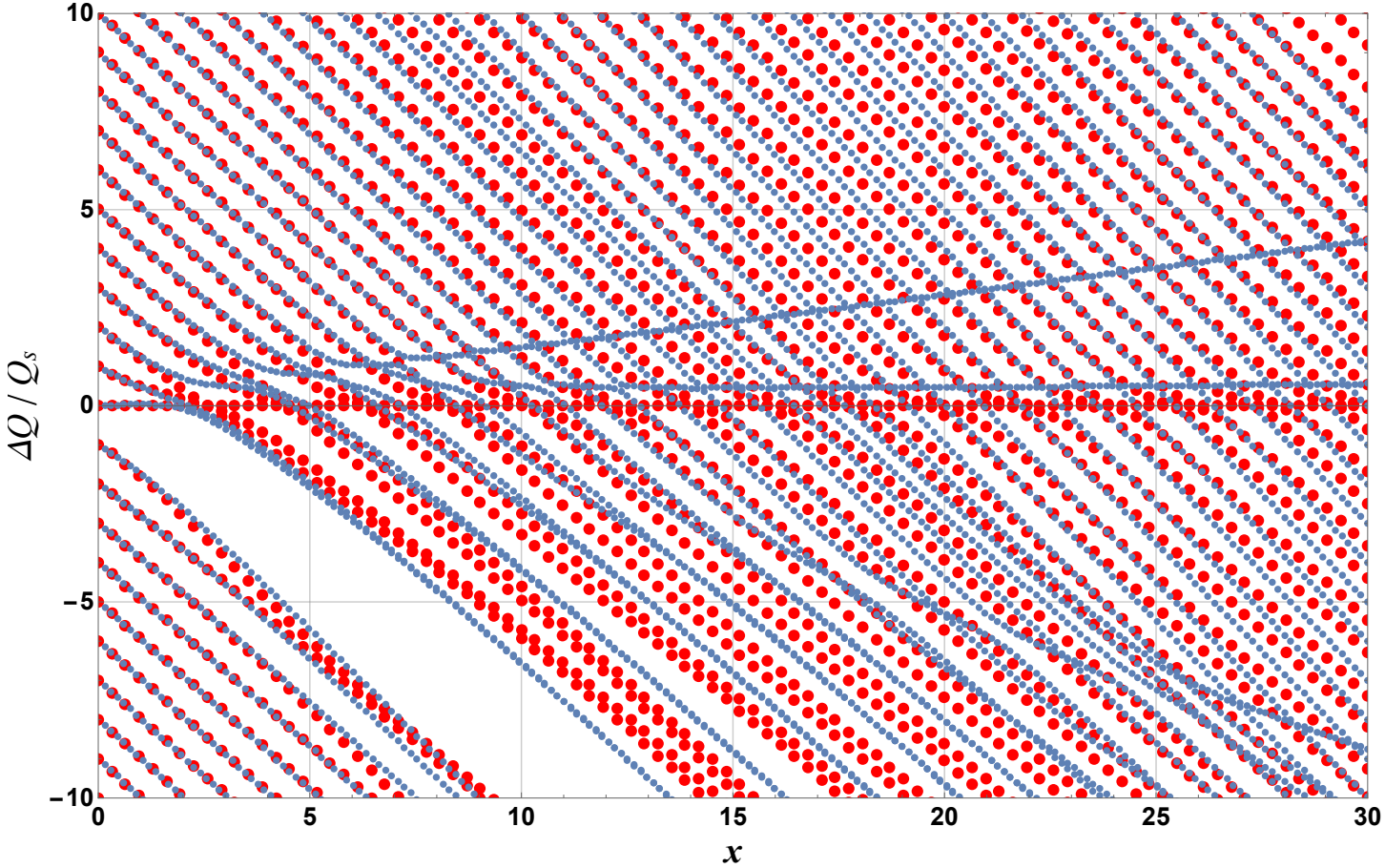
=> Follow-up of HSC talk from 29/06/2020 (see https://indico.cern.ch/event/932629/contributions/3919088/attachments/2062309/3466054/SCmodesFromGALACTIC-ComparisonWithBimBim_EM_29-06-20.pdf) with a larger range of modes and SC parameter

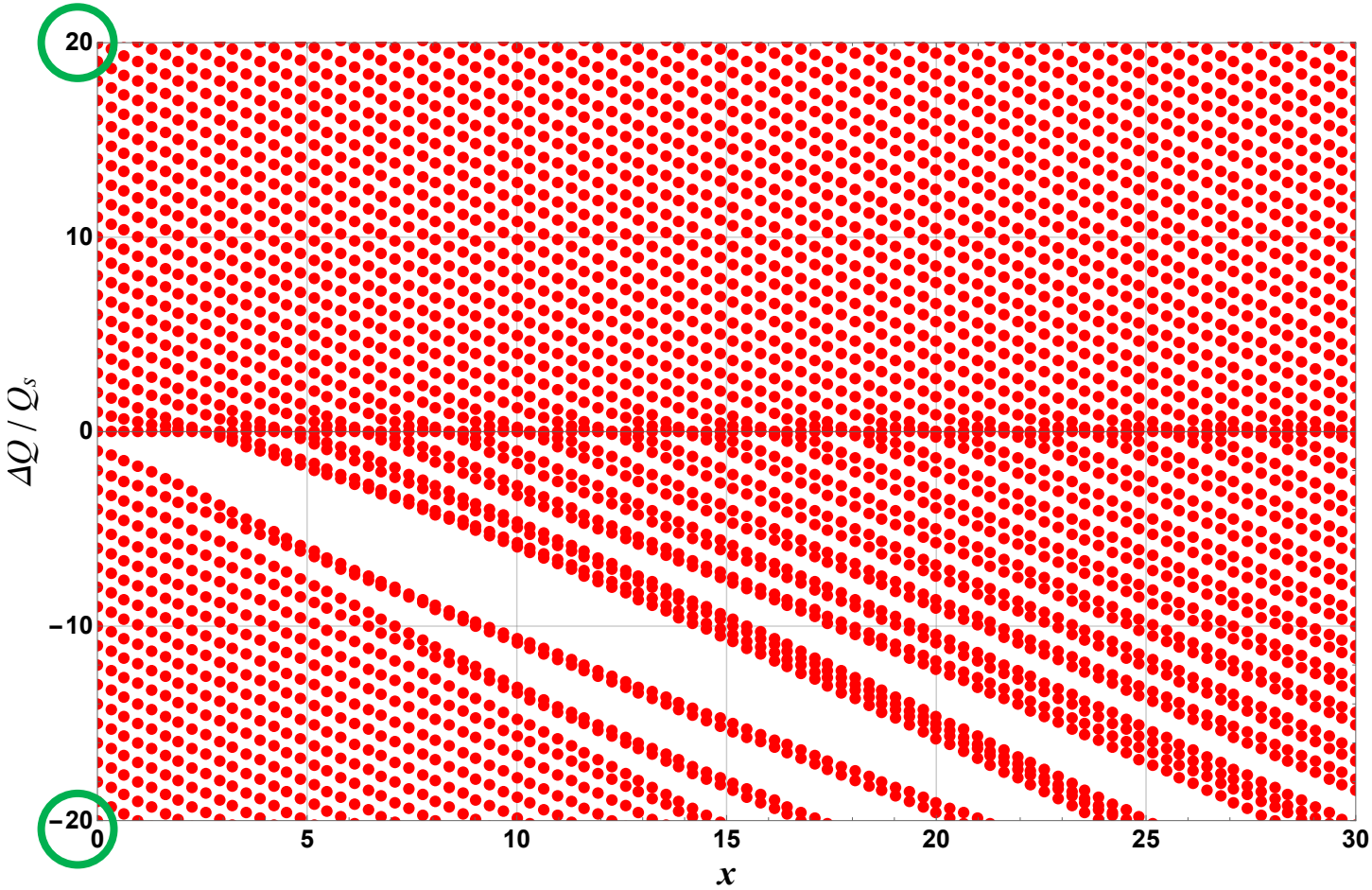
N.B.: the horizontal axis was adjusted such that $x = x_{GALACTIC} = \frac{x_{BimBim}}{1.55}$

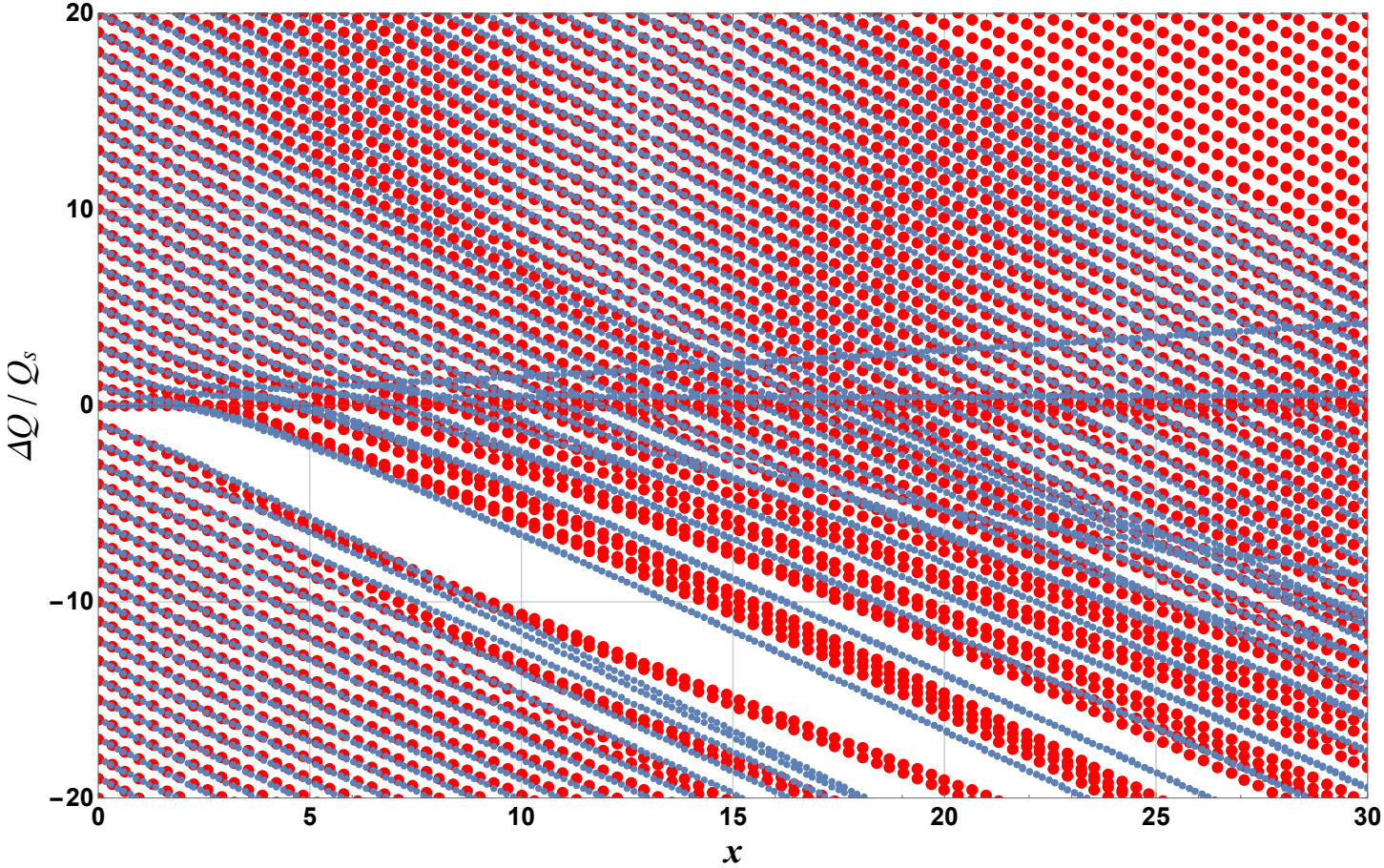
with $x_{GALACTIC} = q_{sc} = \frac{\Delta Q_{SC}}{2\,Q_s}$ *(for WB) and* $x_{BimBim} = \frac{\Delta Q_{SC}}{Q_s}$ *(for Gaussian)*

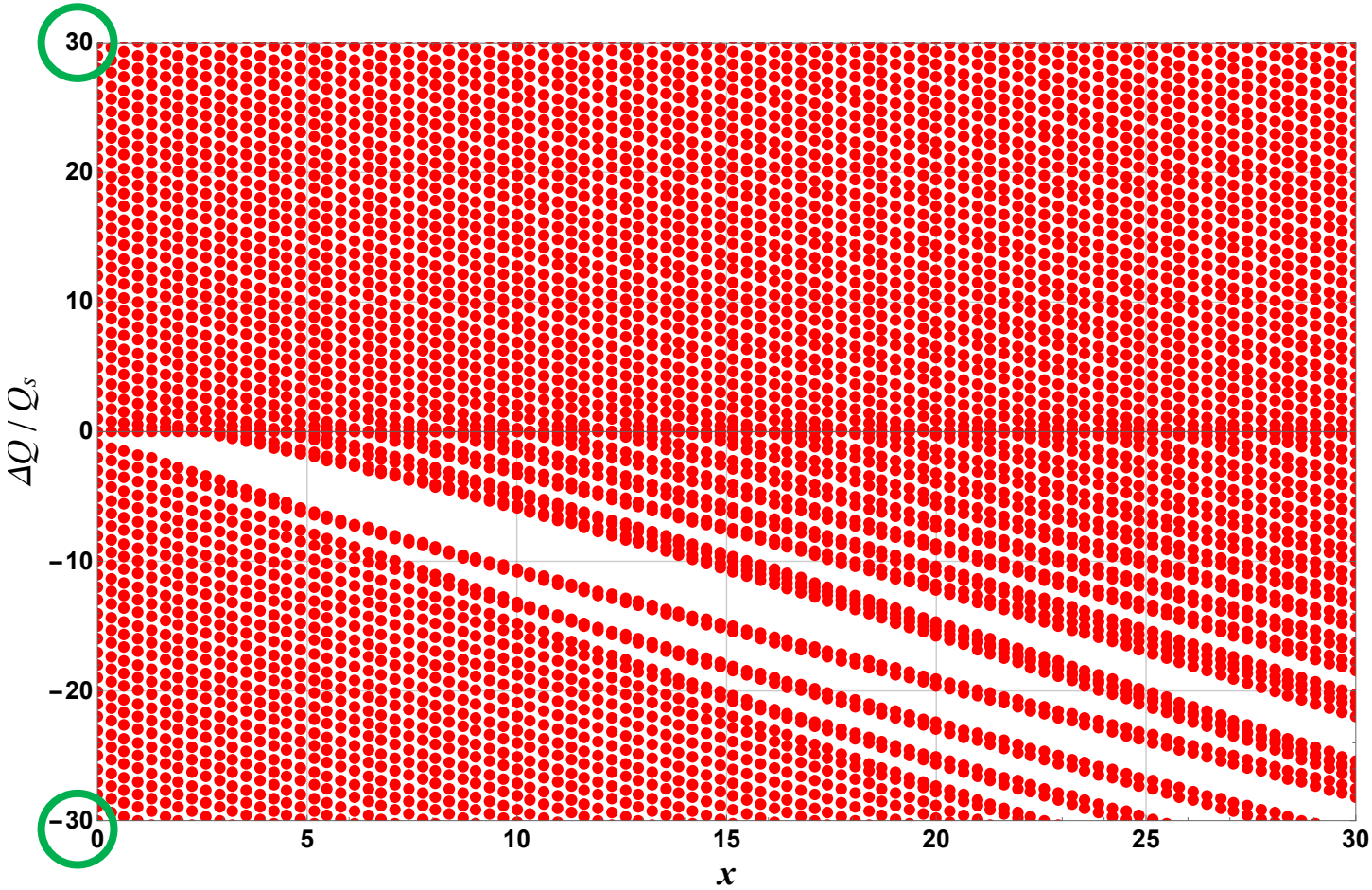

10
5
0
−5
−10
0
5
10
15
20
25
30
$\Delta Q / Q_s$
x

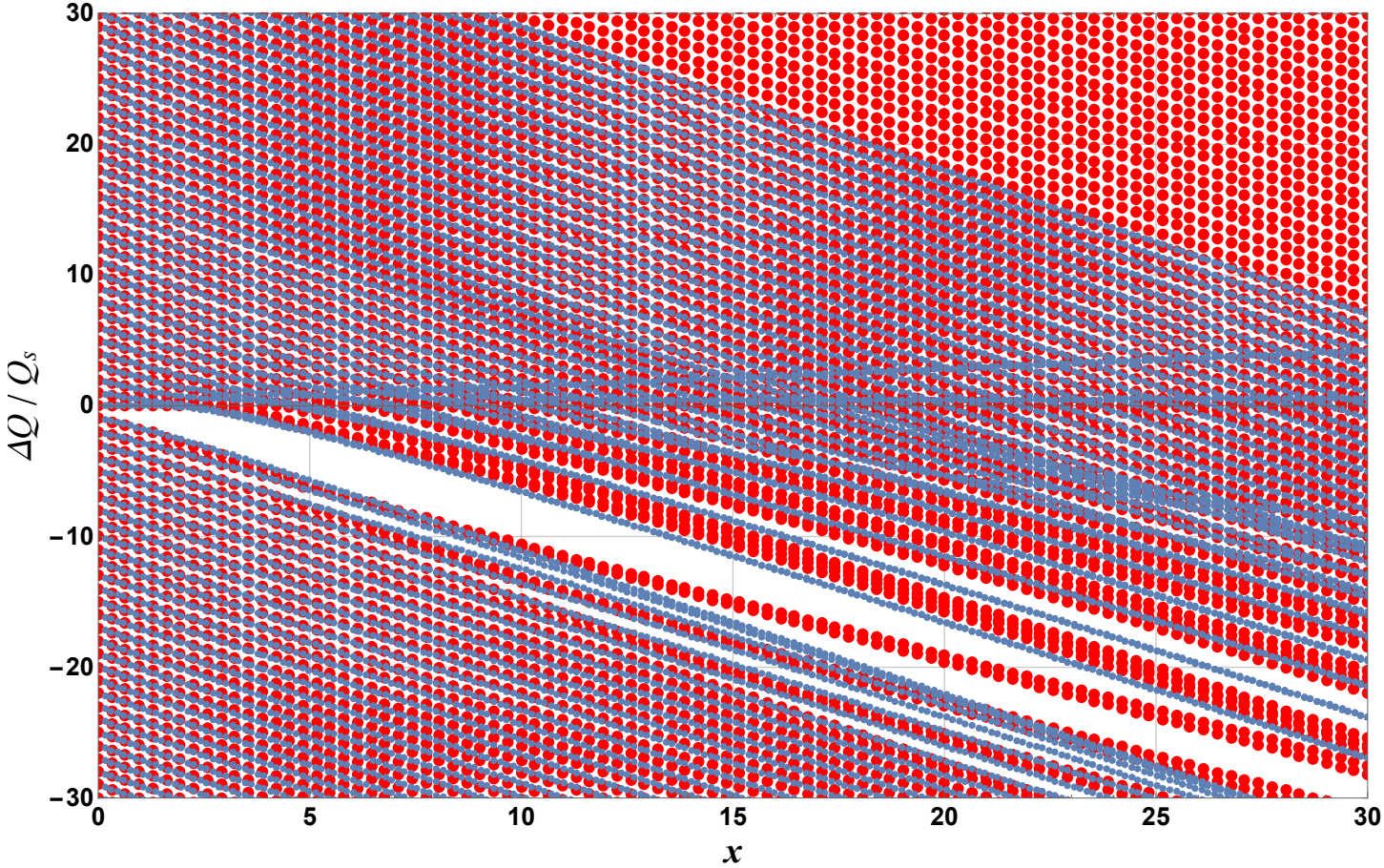

10
5
0
−5
−10
0
5
10
15
20
25
30
$\Delta Q / Q_s$
x


10
5
0
−5
−10
0
5
10
15
20
25
30
$\Delta Q / Q_s$
x

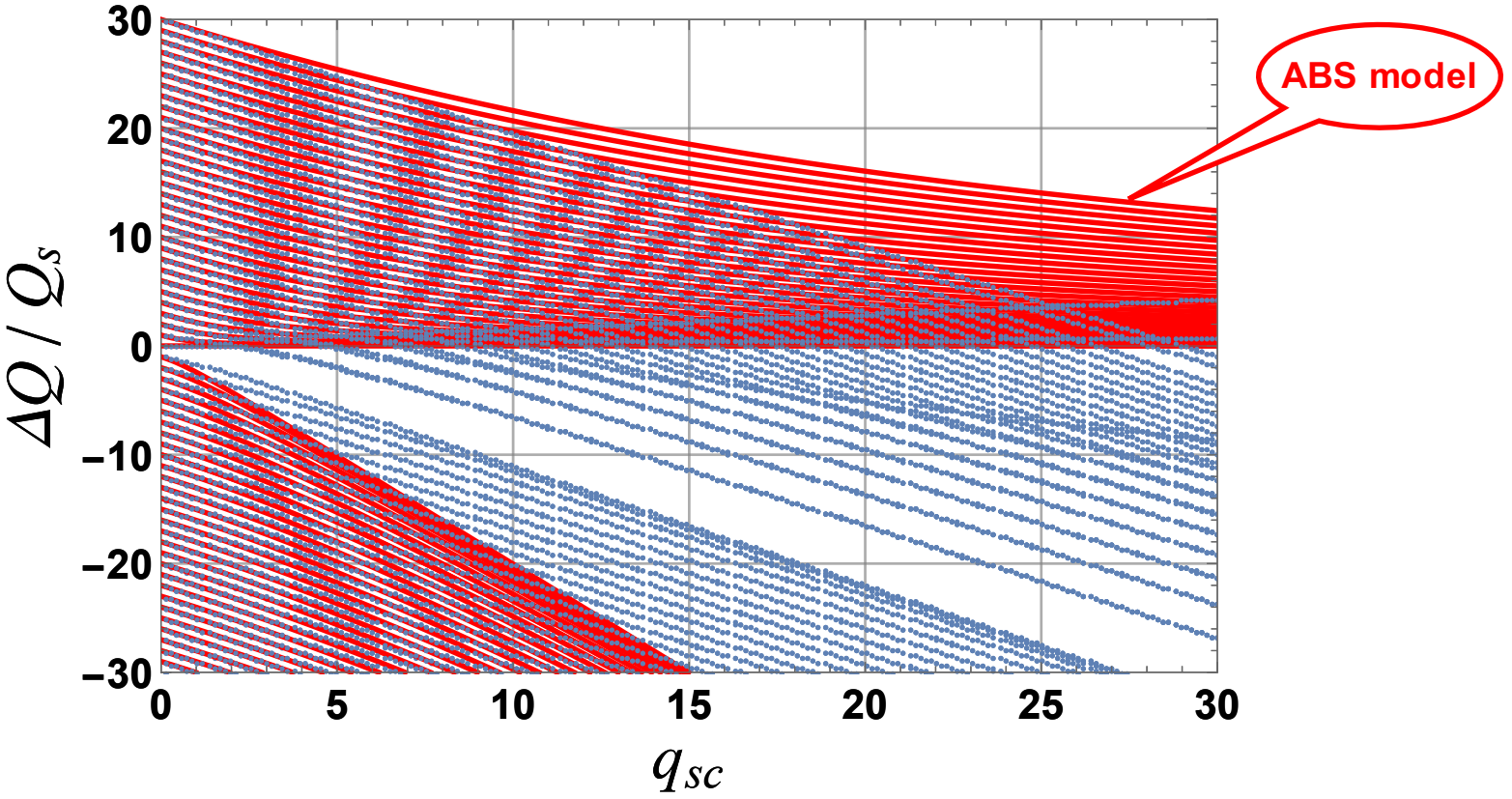

20
10
0
−10
−20
$\Delta Q / Q_s$
0
5
10
15
20
25
30
x


20
10
0
−10
−20
0
5
10
15
20
25
30
$\Delta Q / Q_s$
x


30
20
10
0
−10
−20
−30
$\Delta Q / Q_s$
0
5
10
15
20
25
30
x


30
20
10
0
−10
−20
−30
0
5
10
15
20
25
30
$\Delta Q / Q_s$
x

Conclusions

- Some interesting (common) new features and differences => See more details in https://indico.gsi.de/event/10458/contributions/45035/attachments/31926/40534/MitigationOfTMCIthroughSC_EM_30-06-2020.pptx
- Reminder: GALACTIC was first solved in a 2-step approach (i.e. not self-consistently yet)
- Next
  - Try and compare only the part without the incoherent force (between GALACTIC and BimBim) => Work to be done in BimBim
  - Solve GALACTIC and/or another Vlasov solver (DELPHI) self-consistently to 1) see the differences between the non self-consistent and the self-consistent approaches and 2) try and reproduce the BimBim results

Reminder: GALACTIC vs. ABS model