Effect of a "constant detuning tune shift" for TMCI using GALACTIC
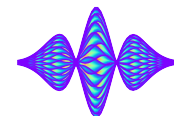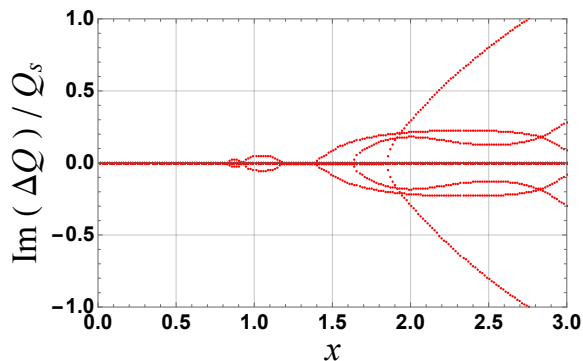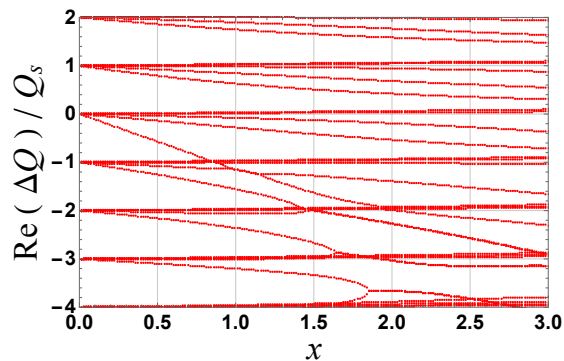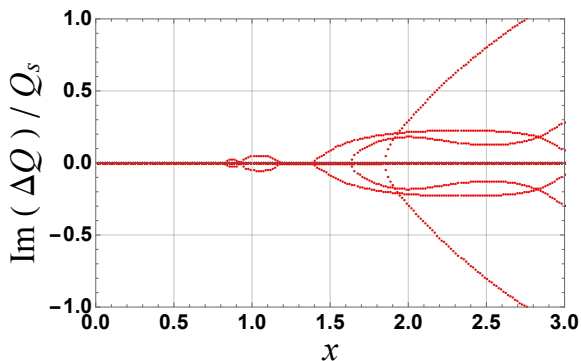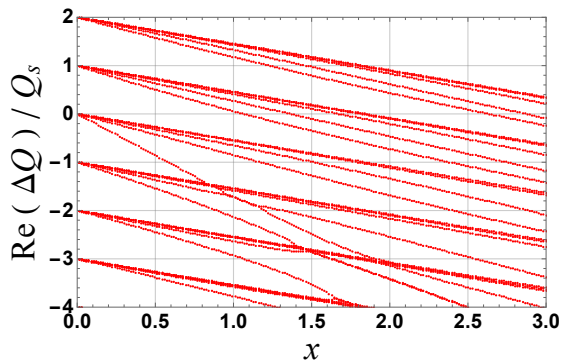
E. Métral

◆ See full theory from GianniI discussed during the last HSC section meeting (https://indico.cern.ch/event/904845/contributions/3818765/attachments/2022686/3382758/012_ecloud_delphi.pdf)

◆ Goal here is just to see what this "constant term" would do in GALACTIC for the usual SPS BB resonator with $f_r \tau_b = 2.8$
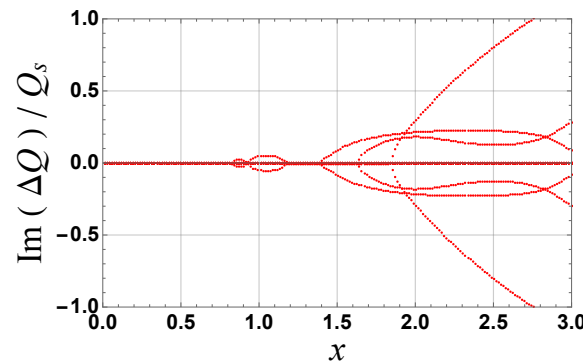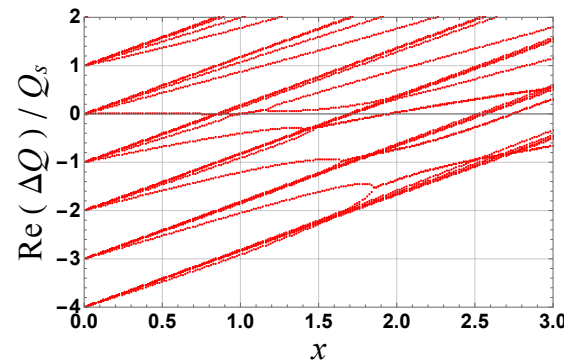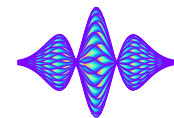
Round Flat-V Flat-H

Conclusion

◆ With this simplified model of a "constant detuning tune shift" (along the length of a "long bunch"), the detuning impedance is (heavily) changing the slope of the modes but neither the threshold nor the instability growth rate (vs. the normalised intensity parameter x, which includes a driving Yokoya factor)

◆ The intensity thresholds in the H&V-planes of a flat chamber are increased compared to the round chamber case by the inverse of the driving Yokoya factor

   ▪ **Factor** $\frac{12}{\pi^2} \approx 1.2$ **in V-plane**

   ▪ **Factor** $\frac{24}{\pi^2} \approx 2.4$ **in H-plane**

To be compared to past HEADTAIL simulations from BenoitS: factor ~ 1 in V-plane and factor ~ 2 in H-plane

◆ *Reminder: Full analysis / understanding with Giannil's recent analysis* (*https://indico.cern.ch/event/904845/contributions/3818765/attachments/2022686/3382758/012_ecloud_delphi.pdf*)