Prepared by the scientific secretary: D. Noll

Talk by O. Boine-Frankenheim:

E. Metral: how long is sis 100 (injection?)

-> few ms before adiabatic capture, 3 Hz

Remark from I. Hofmann: didn't have quadrupolar pickup in the initial measurements, but only two bpms, horizontal / vertical in sequence, which works

-> not for bunched beams

I. Hofmann: reasonable for coasting

S. Machida: also used this setup

E. Metral: agreement with theory?

S. Machida: yes

Talk by A. Burov:

O. Boine-Frankenheim: electron cloud acts like a damper, octupole?

-> yes, but incoherent emittance growth

P. Zenkevich: doubts that the influence of external nonlinearities (octupole) are small far from the bunch center, longitudinal pieces exist where spread due to external nonlinearity exceeds shift due to space charge forces. Always regions exists where theory is not applicable when mean external nonlinearity is not zero

 -> to strong statement, head-tail landau damping

 -> use pertubative approach: first solve ignoring head and tail, theory is applicable for core (step 1), in step 2: knowing the eigenfunctions/values find (heat?) transfer to head/tail

 -> speaker not convinced that solution is correct, vladimir is checking by simulation, already calculated numerical coefficient, not checked for octupolar

O. Boine-Frankenheim: in the case of strong sc landau damping not relevant, because damping is weak; in his simulations for moderate sc the effect of non linearity from non-linear space charge forces is stronger than those due to landau damping

Talk by Vladimir Kornilov:

L. Vorobiev: breakup model, near coasting beam -> not coasting beam near transition

-> central part of bunch, oscillation in the bunch is smaller than length, coasting beam for high frequency allows estimation of landau damping

Question: differences from standard microwave instability?

S. Gilardoni:

 - mentions use of cern machines for prediction in gsi machines

 - thesis from "sanda" (?) as reference on observed modes, give prediction that future LHC beams will be stable

Talk by T. Argyropoulos:

E. Metral: indepency from van-kampen modes? how do these modes change the understanding of the presented effects?

-> Complementary, region with zero derivative is most critical, causing problems

I. Hofmann: van kampen mode is the damping part from spectrum of particles, integral of single particle spectrum causes damping

L. Vorobiev: Were the simulations done with zero impedance?

-> Study only for the inductive part, with SPS impedance model from two years ago, distributed around the machine but done as a kick

Talk by S. Aumon

E. Metral: Experiment in the ps possible? Tune shift of -1 was measured at an experiment in the past

O. Boine-Frankenheim: severe emittance growth in this experiment, beam loss was small

S. Gilardoni: seen in experiment already, emittance blowup ~40%

E. Metral: effect might be a nice benchmark

L. Vorobiev: Ventorini developed equation for long electron bunches, where the beam occupies nearly the whole circle. Bunches were investigated in the presentation. Voices concerns, that Ventorini equations might not be applicable

-> Compared optics from transverse envelope equations and it seems to work

L. Vorobiev: recommends reading paper to check assumptions

O. Boine-Frankenheim: Synchrotron motion can be neglected

G. Franchetti: different space charge in different slices

P. Zenkevich: if the length of the bunch is larger than the transverse size, use of the equation should be correct

Talk by J. Qiang:

I. Hofmann: Which interaction leads to the noise?

-> Noise from particle in cell, but number of particles same order of magnitude as in the real beam

I. Hofmann: real shot noise or numerical shot noise?

I. Hofmann: particles per cell?

-> couple 100

O. Boine-Frankenheim: mentions micro instabilities driven by space charge

I. Hofmann: puzzled about last result, wavelength in μm, comparison with grid length?

-> ~1000 grid points

J. Fitzek: MPI? how many nodes?

-> ~1000 cores

K. Ohmi: is 5 billion enough?

C. Chen: Retardation effects included in simulation?

-> no

J.L. Vay: comment on size of the simulation: space weather simulation use trillions of macroparticles

S. Webb: Have they used pair method to reduce shot noise? quiet / crowd (?) loading?

-> loose distribution

S. Machida: important question is how to generate the initial distribution?

I. Hofmann: Comparison of a fully self consistent simulation with coulomb potential frozen would be more interesting than with frozen synchrotron motion, frozen models only modulate space charge field, not update it

-> Working on this, compare full simulation with gaussian model