Topical Workshop on Instabilities, Impedance and Collective Effects 2014 (TWIICE2014)

Report of Contributions

https://indico.cern.ch/e/twiice2014

Contribution ID: **1** Type: **not specified**

talk2

Contribution ID: **2** Type: **not specified**

Test 1

Contribution ID: **3** Type: **not specified**

talk2

Contribution ID: **4** Type: **not specified**

talk3

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Contribution ID: **6** Type: **not specified**

Theory of Beam Transverse Instabilities

Thursday 16 January 2014 09:00 (35 minutes)

(Review)
Main theoretical aspects of beam transverse instabilities in low-emittance rings are successively considered. First, coherent tune shifts are found with the nested head-tail method for arbitrary longitudinal distribution and single and coupled bunches, and with a feedback damper taken into account. Then, the transverse nonlinearity is included, and Landau damping is analyzed by means of stability diagrams. High single-side asymmetry of these diagrams for e+/e- beams is pointed out as a serious stability limitation. An influence of longitudinal-to-transverse Landau damping is discussed, and ideas to improve stability are suggested. At the end, key features of e-cloud instability are briefly considered.

Presenter: BUROV, Alexey (Fermi National Accelerator Lab. (US))

Session Classification: Impedances and Instabilities

Contribution ID: **7** Type: **not specified**

Comparison simulations-measurements of Single Bunch instabilities at DIAMOND

Friday 17 January 2014 15:15 (20 minutes)

Presenter: Dr BARTOLINI, Riccardo (Diamond Light Source and John Adams Institute)

Session Classification: CSR Instabilities

Contribution ID: **8** Type: **not specified**

Evaluation of Collective Effects for the ESRF Upgrade Project

Thursday 16 January 2014 09:55 (20 minutes)

A project to fully rebuild the main ring in the existing tunnel is underway at the ESRF. A preliminary analysis of the collective effects we may face operating this new machine will be presented. Current thresholds will be evaluated extrapolating data collected on the actual ESRF. Beam emittance growth including bunch lengthening and intra- beam scattering will also be discussed.

Presenter: PERRON, Thomas (ESRF)

Session Classification: Impedances and Instabilities

Contribution ID: **9** Type: **not specified**

The impedance localization method: theory, measurements and predictions for accelerator machines

Friday 17 January 2014 09:45 (20 minutes)

The beam coupling impedance leads to limitations in beam brightness and needs accurate quantification and continuous monitoring
in order to detect and mitigate high impedance sources. In the CERN hadron accelerators, kickers and collimators
are expected to be major contributors to the total imaginary part of the machine transverse impedance. In order to detect
other sources, beam based techniques have been developed and used in many accelerators around the world. In this work we will present the impedance localization method from a theoretical and experimental point of view, focusing on the measurement accuracy and the impedance reconstruction method. We will also present predictions for the method application to the SOLEIL accelerator.

Presenter: BIANCACCI, Nicolo (Universita e INFN, Roma I (IT))

Session Classification: Impedances and Instabilities

Contribution ID: **10** Type: **not specified**

Recent Developments in Wakefield and Impedance Computations

Thursday 16 January 2014 10:55 (35 minutes)

(Review)
This talk will review some recent developments in the area of wakefield and impedance calculations. Both for modern light sources and colliding machines these developments were mostly motivated by harder-to-deliver (or more exotic) beam parameters as well as more stringent requirements coming from beam dynamics and other machine constraints. After reviewing these, the talk will cover some new analytical methods in wakefield and impedance calculations, as well as state-of the art computational techniques. It will attempt to discuss both the geometric and resistive wall wakefields/impedances (leaving the subject of CSR impedance to other speakers). The talk will end with some speculative predictions about future developments in the field.

Presenter: PODOBEDOV, Boris (BNL)

Session Classification: Impedances and Instabilities (continue)

Contribution ID: **11** Type: **not specified**

Impedance Optimization and Wakefield Codes Comparison for the Brazilian Light Laboratory

Thursday 16 January 2014 11:30 (20 minutes)

For the future 3rd Generation Brazilian Light Source, Sirius, an evaluation of several electromagnetic simulation software was done, motivated by the small ˜3 mm Sirius bunch length. User interface was analyzed on CST, ACE3P and GdfidL and their numerical errors were compared with ECHO code. Impedance optimization of some components will be shown as well.

Presenter: DUARTE, Henrique de Oliveira Caiafa (LNLS)

Session Classification: Impedances and Instabilities (continue)

Contribution ID: **12** Type: **not specified**

Longitudinal impedance characterisation of the CLIC stripline in view of its in the ALBA storage ring

Thursday 16 January 2014 11:50 (20 minutes)

In the framework of a collaboration between the CLIC project at CERN and CELLS a 1.7m long prototype stripline will be tested in the ALBA storage ring. The power loss of the stripline flanged to the ALBA vacuum pipe is computed under consideration of an external load connected to the feedthroughs. Although the total power loss at 400mA is still significant (78W), the external load consumes 58W and only 20W remain inside the stripline.

Presenter: GUENZEL, Thomas (CELLS/ALBA)

Session Classification: Impedances and Instabilities (continue)

Contribution ID: **13** Type: **not specified**

Geometric Beam Coupling Impedance of LHC Collimators

Thursday 16 January 2014 12:10 (20 minutes)

The High Luminosity LHC project (HiLumi LHC) is aimed at increasing the LHC luminosity by an order of magnitude. One of the key ingredients to achieve the luminosity goal is the bunch (and beam) intensity increase. In order to keep under control harmful beam instabilities and to avoid excessive power losses in these conditions a careful design of new vacuum chamber components and an update and refinement of the present LHC beam impedance model are required. LHC collimators are among the main beam coupling impedance contributors. Measurements with beam performed at different collimator gaps and different single bunch currents have revealed that the measured betatron coherent tune shifts were by approximately a factor of 2 higher with respect to the theoretical predictions based on the current LHC impedance model. Up to now the resistive wall impedance has been considered as the dominating impedance contribution of the collimators. Here, by carefully simulating the geometric impedance of the collimators we show that for the graphite collimators with half-gaps higher than 10 mm the geometric impedance exceeds the resistive wall one. In turn, for the collimators made of tungsten the geometric impedance becomes dominant for all used gap values. Hence, including the geometric impedance of the collimators into the LHC impedance model enabled us to reach a better agreement between the measured and simulated collimator tune shifts.

Presenter: FRASCIELLO, Oscar (I)

Session Classification: Impedances and Instabilities (continue)

Contribution ID: **14** Type: **not specified**

Short-range wake field studies

Thursday 16 January 2014 12:30 (20 minutes)

In order to maintain the high quality of the beam it is crucial to study the effect of the wake fields on the bunches. The linear accelerators often require extreme stability of the beam parameters such as emittance and energy spread. Using the scheme recently proposed by B. Podobedov and G. Stupakov the short-range wake fields are investigated with MAX IV linac as an example. MAX IV linac will serve as not only the top up injector to the two synchrotron rings but it also will accelerate and compresses electron bunches for the short-pulse facility. In the main linac, after the first bunch compressor, the bunches are 0.23 ps long. The short range wake fields are obtained as well as the limit of the point charge wake and compared to the current wake model.

Presenter: SKRIPKA, Galina (Univ. of Lund)

Session Classification: Impedances and Instabilities (continue)

Contribution ID: **15** Type: **not specified**

Impedance Analysis of Insertion Devices

Thursday 16 January 2014 13:45 (20 minutes)

To estimate the vertical impedance of more complex geometry as an In-Vacuum Undulator we cross-checked first the results for simple geometries.
Axially symmetric tapered structure and rectangular structures are under discussion. Comparison of analytical results with numerically obtained data
using different EM Field Solvers. Two types of the In-Vacuum Undulator have been analyzed, the standard In-Vacuum Undulator and Adaptive Gap Undulator,
which offer increase of source brightness.

Presenter: BLEDNYKH, Alexei (NSLS-II)

Session Classification: Impedances and Instabilities (continue)

Contribution ID: **16** Type: **not specified**

Beam Coupling Impedance Studies of the CLIC Damping Ring Extraction Kicker

Thursday 16 January 2014 14:05 (20 minutes)

The Compact Linear Collider (CLIC) aims for electron-positron collisions with high luminosity at a nominal centre-of-mass energy of 3 TeV. Pre-Damping Rings (PDRs) and Damping Rings (DRs) are required for reducing the emittance of the electron and positron beams before it is injected into the booster linac. Several stripline kicker systems will be used to inject and extract the beam from the CLIC PDRs and DRs. Wakefields produced by the beam passing through the aperture of the striplines may become an important source of emittance growth. In this paper, an analytical study of the beam coupling impedance of striplines for the DR is carried out, and compared with CST Particle Studio simulations, for a frequency range up to 10 GHz. The effect of several components of the stripline kicker, such as electrode supports and feedthroughs, is also presented. The possibility of tapering the electrodes in order to improve the longitudinal beam coupling impedance is also studied.

Presenter: BELVER AGUILAR, Carolina (CERN)

Session Classification: Impedances and Instabilities (continue)

Contribution ID: **17** Type: **not specified**

Review of Particle Scattering

Thursday 16 January 2014 14:30 (35 minutes)

(Review)

Presenter: DEMMA, Theo (LAL)

Session Classification: Particle Scattering

Contribution ID: **18** Type: **not specified**

Design of IBS dominated low emittance ring

Thursday 16 January 2014 15:05 (20 minutes)

Presenter: ANTONIOU, Fanouria (National Technical Univ. of Athens (GR))

Session Classification: Particle Scattering

Contribution ID: **19** Type: **not specified**

Intrabeam scaterring studies at CESR-TA

Thursday 16 January 2014 15:25 (20 minutes)

Low emittance electron and positron storage rings with an energy of a few GeV are important tools for scientific research. This will be increasingly true in coming years for next generation colliders such as CLIC and ILC, and for light sources as they approach 'ultimate storage ring' conditions. CESR-TA is a research program at Cornell University aimed at better understanding the physics of these machines. In this talk, I will present recent measurements of current-dependent beam sizes in all three dimensions at CESR, and discuss the theory used to understand them. The beam currents range from 10ˆ9 to 10ˆ11 particles/bunch. Intrabeam scattering (IBS) and potential well distortion are evident in our data. Additionally, at high current, an unidentified instability is observed in our vertical measurements. Except for this unexpected vertical beam size blowup, our measurements are in good agreement with IBS theory.

Presenter: WANG, Suntao (Cornell University)

Session Classification: Particle Scattering

Contribution ID: **20** Type: **not specified**

Review of Two-Stream Instabilities

Thursday 16 January 2014 16:05 (35 minutes)

(Review)

Presenter: RUMOLO, Giovanni (CERN)

Session Classification: Two-Stream Instabilities

Contribution ID: **21** Type: **not specified**

Electron cloud mitigation via new materials and material coating

Thursday 16 January 2014 16:40 (20 minutes)

Electron cloud is an ubiquitous effect in positively charted particle accelerators and has been observed to induce unwanted detrimental effects on beam quality, stability, vacuum etc. In this presentation a short review of the present understanding of the mitigation strategies adopted so far will be given with particular emphasis to the ongoing research on new materials and material coatings to mitigate or prevent electron cloud induced instabilities.

Presenter: Dr CIMINO, Roberto (LNF-INFN)

Session Classification: Two-Stream Instabilities

Contribution ID: **22** Type: **not specified**

Electron cloud build up studies for the CLIC positron damping rings

Thursday 16 January 2014 17:00 (20 minutes)

The formation of an Electron Cloud (EC) in the vacuum chambers could significantly limit the performances of the positron damping ring of the Compact Linear Collider (CLIC). Depending on the Secondary Electron Yield (SEY) of the inner surface of the vacuum chambers, electrons generated by photoemission due to synchrotron radiation, can multiply through beam induced multipacting and accumulate in the chamber. The high electron flux on the chamber's wall can lead to important heat loads on the cold wigglers and degrade the vacuum quality all along the ring due to electron simulated desorption. Moreover, the high electron density in the vacuum chamber can induce coherent and incoherent effects on the beam (e.g. instabilities, emittance blow up). A PyECLOUD simulation campaign has been carried out in order to characterize the EC build up in the different components of the ring (dipole, quadrupole and wiggler magnets) and provide specifications for suitable mitigation strategies, like low SEY coatings and/or clearing electrodes.

Presenter: IADAROLA, Giovanni (CERN - University of Naples Federico II)

Session Classification: Two-Stream Instabilities

Contribution ID: **23** Type: **not specified**

Electron-cloud instability in the CLIC damping ring for positrons

Thursday 16 January 2014 17:20 (20 minutes)

Coherent beam instabilities induced by an electron cloud could be a serious performance limitation for the positron damping rings of CLIC. In this context, we present numerical simulations of the electron cloud instability: The electron cloud distribution before each bunch passage is generated with the build-up code PyECLOUD and used as input for HEADTAIL simulations in order to assess the onset of the single bunch instability. The maximally tolerated Secondary Electron Yield of the vacuum chamber surface without beam instability is addressed for the bending magnets, the wigglers and the quadrupoles.

Presenter: BARTOSIK, Hannes (CERN)

Session Classification: Two-Stream Instabilities

Contribution ID: **24** Type: **not specified**

Fast Beam-Ion Instability Arising from Local Outgassing

Thursday 16 January 2014 17:40 (20 minutes)

In this talk we shall review a series of observations, experimental analyses and simulations made at SOLEIL on beam instabilities which are now identified as fast beam-ion instability arising from local outgassing. Peculiarity of these phenomena is that despite being ion instability, uniform beam filling is preferred to avoid the instability. An explanation is given, also suggesting that the assumed mechanism may get further enhanced in future low emittance light sources. Another long existing puzzle was the complete beam losses that often result in this instability, which apparently contradicts with what can be expected from theory. The involvement of transverse feedback running against machine impedance induced instabilities (resistive-wall) shall be described with experimental and simulation studies. The talk will also introduce similar ion-induced instabilities recently observed at the SSRF (Shanghai Synchrotron Radiation Facility) with the data provided the by SSRF colleagues.

Presenter: NAGAOKA, Ryutaro (Synchrotron SOLEIL)

Session Classification: Two-Stream Instabilities

Contribution ID: **25** Type: **not specified**

Impact of Harmonic RF Sysytems on Beam Dynamics in Ultimate Storage Rings

Friday 17 January 2014 08:30 (35 minutes)

(Review)

Presenter: BYRD, John (LBNL)

Session Classification: Impedances and Instabilities

Contribution ID: **26** Type: **not specified**

Investigation of transverse beam instabilities in the MAX IV 3 GeV ring using the multibunch code mbtrack

Friday 17 January 2014 09:05 (20 minutes)

We developed a macroparticle multibunch tracking code called mbtrack which can account for various collective effects as resistive wall and geometric ring impedance, multiple cavities either active or passive and even ion beam interaction. Besides the presentation of the code's main features we take the MAX IV 3 GeV storage ring as an example to demonstrate its capabilities. The new MAX IV facility under construction will combine challanging low emmittance with high beam intensities and small vacuum chamber radii. Special attention will be paid here to simulate dynamically the generated field of the passive harmonic cavities, which are designed to lengthen a bunch by a factor of 5 at 500 mA. Their impact on the beam dynamics is pursued to investigate the Landau damping effects possibly induced in both the longitudinal and transverse planes.

Presenter: KLEIN, Marit (Soleil)

Session Classification: Impedances and Instabilities

Contribution ID: **27** Type: **not specified**

Impedance and collective effects in Beijing Advanced Photon Source

Thursday 16 January 2014 09:35 (20 minutes)

Beijing Advanced Photon Source (BAPS) is a 5GeV storage ring-based light source. Due to the low emittance and high beam current, the collective effects may bring new challenges to the physical design of the machine. A thorough evaluation of the coupling impedance is necessary in controlling the total impedance of the ring, which can accordingly prevent the occurrence of the beam instability. The primary studies on the impedance and collective effects in BAPS are presented. Because of its small radius vacuum chamber and large circumference, the resistive wall impedance is a dominant contribution to the impedance budget. Feedback system is required to stabilize the beam against the transverse resistive wall instability. The Fast beam ion instability is another potential mechanism for driving collective instabilities. Multi-train filling pattern should be used along with efficient feedback system to damp the instability.

Presenter: WANG, Na (BAPS)

Session Classification: Impedances and Instabilities

Contribution ID: **28** Type: **not specified**

High frequency effects of impedance and coatings in the CLIC damping rings

Thursday 16 January 2014 10:15 (20 minutes)

Single bunch instability thresholds and the associated coherent tune shifts have been evaluated in the transverse plane for the damping rings (DR) of the Compact Linear Collider (CLIC). A multi-kick version of the HEADTAIL code was used to study the instability thresholds in the case where different impedance contributions are taken into account such as the broad-band resonator model in combination with the resistive wall contribution from the arcs and the wigglers of the DR. Preliminary studies on the impact of the strip-line kickers are also addressed. Coating materials will be used in the CLIC DR to suppress two-stream effects. In particular, NEG coating is necessary to suppress fast beam ion instabilities in the electron damping ring (EDR). The EM characterization of the material properties up to high frequencies is required for the impedance modeling of the CLIC DR components. The EM properties in the frequency range 9 –12 GHz are determined with the waveguide method, based on a combination of experimental measurements of the complex transmission coefficient S21 and CST 3D EM simulations. The results obtained from a NEG coated copper (Cu) and a stainless steel waveguide are presented.

Presenter: KOUKOVINI PLATIA, Eirini (Ecole Polytechnique Federale de Lausanne (CH))

Session Classification: Impedances and Instabilities

Contribution ID: **29** Type: **not specified**

Impact of Incoherent Transverse Wake Field on Storage Ring Optics

Friday 17 January 2014 10:05 (20 minutes)

In third generation synchrotron light sources such as SOLEIL, the large number of small gap insertion devices imposes vertical limitations of the vacuum chamber aperture. The former induce an incoherent transverse wake field due to the resistive-wall effect in flat chambers and lead to betatron tune variation with stored current and an optical function symmetry break. Since at SOLEIL, the sensitivity of beam lifetime and injection efficiency to betatron tunes is very high in the presence of insertion devices, this additional focusing cannot be neglected. We will show, with a series of optics measurements carried out, the extent to which the nominal tuning is modified.

Presenter: BRUNELLE, Pascale (Synchrotron SOLEIL)

Session Classification: Impedances and Instabilities

Contribution ID: **30** Type: **not specified**

Impedance Optimization of Small Gap Chambers for the High Single Bunch Current Operation at APS

Friday 17 January 2014 09:25 (20 minutes)

The high intensity per single bunch is required for the timing mode x-ray users at the APS. In order to keep 16-mA operation with the new smaller gap ID chambers we need to reduce the impedance of the chamber through optimization. In this talk we described the impedance reduction process which resulted in the engineering design for the new 5-mm gap chamber to be installed in September 2014.

Presenter: CHAE, Yong-Chul (APS)

Session Classification: Impedances and Instabilities

Contribution ID: **31** Type: **not specified**

Review of Instrumentation and Feedback for Beam Instabilities

Friday 17 January 2014 10:50 (35 minutes)

(Review)

Presenter: REHM, Guenther (Diamond Light Source)

Session Classification: Instrumentation and Feedback

Contribution ID: **32** Type: **not specified**

Bunch-by-bunch feedback system for hybrid filling and recent topics in SPring-8

Friday 17 January 2014 11:25 (20 minutes)

The hybrid filling composed of singlets with high bunch current and bunch trains with low bunch current is in user operation at SPring-8, by simultaneously suppressing single-bunch instabilities of singlet and multi-bunch instabilities of trains by the Spring-8 bunch-by-bunch feedback system. To overcome the high contrast of the bunch current between singlets and trains, a bunch current sensitive attenuator was developed to equalise the BPM signals for the singlets and trains, not to saturate the system with high level signal from singlets. And the struggle against strong single-bunch instability and recent progress including new type longitudinal kicker and new feedback processors collaborating with SOLEIL will be described.

Presenter: NAKAMURA, Takeshi (Japan Synchrotron Radiation Research Institute)

Session Classification: Instrumentation and Feedback

Contribution ID: **33** Type: **not specified**

Far-infrared and Terahertz detectors for particle accelerators

Friday 17 January 2014 11:45 (20 minutes)

Different radiative phenomena in the far infrared and terahertz ranges can occur in particle accelerators.
Smith-Purcell radiation is emitted when a charged particle passes near a grating. It is being used by the ETALON group at LAL Orsay to determine longitudinal profiles of electron bunches on different Linacs (FACET at SLAC, SOLEIL). Some results will be presented, showing the feasibility of bunch profile measurements for bunches of a hundred of femtoseconds.
Measuring infrared and terahertz radiation is also an efficient way to understand beam dynamics in storage rings.
In SOLEIL, in order to understand the beam instabilities during the operation with a low momentum compaction factor, we measured the temporal and spectral profiles of the Coherent Synchrotron Radiation detected in the terahertz range on the AILES beamline. Using fast bolometers, we observed temporal structures that could be correlated with simulated microstructures in the electron bunches.
The intensity fluctuations of CSR in the terahertz range were also corrected thanks to a double detection scheme, making possible the first use of this radiation as a source for spectroscopic measurements of molecules of astrophysical interest.

Presenter: BARROS, Joanna (LAL in2p3)

Session Classification: Instrumentation and Feedback

Contribution ID: **34** Type: **not specified**

Simulation of high bandwith feedback systems

Friday 17 January 2014 12:05 (20 minutes)

Presenter: LI, Kevin (cern)

Session Classification: Instrumentation and Feedback

Contribution ID: **35** Type: **not specified**

Review of CSR Instabilities

Friday 17 January 2014 13:20 (35 minutes)

(Review)

Presenter: BANE, Karl (SLAC)

Session Classification: CSR Instabilities

Contribution ID: **36** Type: **not specified**

Recent developments on CSR instability measurements at the ANKA storage ring

Friday 17 January 2014 13:55 (20 minutes)

In the past year, several new additions to the beam diagnostics facilities available at the ANKA storage ring have opened new windows to the study of the CSR instability. A detection system consisting of an ultra-fast superconducting THz detector and data acquisition system, for example, was used to investigate correlations visible on the CSR bursting pattern and to study the interactions between bunches. Another example is the setup for near-field single-shot electro-optical bunch profile measurements that has recently become operational in the ANKA storage ring. With this setup it is possible to study the temporal evolution of the longitudinal beam dynamics in low-alpha-operation. In addition to measuring the longitudinal bunch profile, long-ranging wake-fields trailing the electron bunch can also be studied with this setup.

Presenter: MUELLER, Anke-Susanne (Max-Planck-Gesellschaft (DE))

Session Classification: CSR Instabilities

Contribution ID: **37** Type: **not specified**

CSR-driven longitudinal instability-comparison of theorical and experimental results

Friday 17 January 2014 14:15 (20 minutes)

The predictions of numerical solutions of the Vlasov-Fokker-Planck equation for the interaction of electrons moving and radiating on a circle between two perfectly conducting and infinite plates are compared with observations at rings like BESSY II, MLS, ANKA. Comparison is also made with theoretical results obtained for more realistic models of the vacuum chamber which take into account the interference effects between dipoles separated by straight sections. The agreement is surprisingly good.
CSR-driven thresholds can be estimated with the help of the presented diagrams which are more detailed in the limit of the weak instability than reported earlier by K.L.F. Bane, et al., TUPD078, IPAC'10, Kyoto, Japan. A new finding of this work is the relation between the normalized resonance frequency and the ratio of the frequency of the first unstable mode and the synchrotron frequency. This relation seems to be valid for any resonator-like impedance.

Presenter: KUSKE, Peter (BESSY II)

Session Classification: CSR Instabilities

Contribution ID: **38** Type: **not specified**

Measurement of THz bursting thresholds at the Metrology Light Source

Friday 17 January 2014 14:35 (20 minutes)

The Metrology Light Source (MLS) of the Physikalisch-Technische Bundesanstalt (PTB) is able to vary the zero current bunch length over more than two orders of magnitude. Bunch length manipulation can be achieved by adjusting momentum compaction factor, RF-cavity voltage as well as electron energy. The MLS is able to control the three leading orders of the momentum compaction factor and is therefore an ideal machine to investigate the scaling of the bursting instability down to the sub-ps regime.
Measurement technique and recent results will be presented

Presenter: RIES, Markus (Helmholtz-Zentrum Berlin)

Session Classification: CSR Instabilities

Contribution ID: **39** Type: **not specified**

Scaling Law of Coherent Synchrotron Radiation in Rectangular Chamber

Friday 17 January 2014 14:55 (20 minutes)

We study the threshold of longitudinal instability driven by coherent synchrotron radiation in a rectangular chamber in electron storage rings. Starting with Maxwell's equation, we first derive a point-charge wakefield for longitudinal motion. Then we use the wake, along with the Vlasov-Fokker-Planck equation, to show that the threshold can be described by a simple scaling law of ξ = ξth(χ, A, β), where ξ is a dimensionless current, χ the shielding parameter, A the aspect ratio of the vacuum chamber, andˆβ the damping rate relative to the rate of synchrotron oscillation. We further investigate the threshold with simulations for various values of aspect ratios. In particular for a square chamber, we find that ξth ˜ 0.25, which a factor two lower than the threshold in free space.

Presenter: CAI, Yunhai (SLAC)

Session Classification: CSR Instabilities

Contribution ID: **40** Type: **not specified**

Session 1 ”Impedances and Instabilities”

Friday 17 January 2014 16:15 (25 minutes)

Presenters: PODOBEDOV, Boris (Broohaven National Laboratory); BYRD, John

Session Classification: Summary Session

Contribution ID: **41** Type: **not specified**

Session 3 ”Particle Scattering”

Friday 17 January 2014 17:00 (20 minutes)

Presenters: KARANTZOULIS, Emanuel (Elettra -Sincrotrone Trieste); DEMMA, Theo (LAL); PAPAPHILIPPOU, Yannis (CERN)

Session Classification: Summary Session

Contribution ID: **42** Type: **not specified**

Session 4 ”Two-stream Instabilities”

Friday 17 January 2014 17:20 (20 minutes)

Presenters: RUMOLO, Giovanni (CERN); Dr CIMINO, Roberto (LNF-INFN)

Session Classification: Summary Session

Contribution ID: **43** Type: **not specified**

Session 5 ”CSR Instabilities”

Friday 17 January 2014 17:40 (20 minutes)

Presenters: MUELLER, Anke-Susanne (Max-Planck-Gesellschaft (DE)); BANE, Karl (SLAC National Accelerator Laboratory); KUSKE, Peter (BESSY II)

Session Classification: Summary Session

Contribution ID: **44** Type: **not specified**

Session 2 ”Instrumentation and Feedback”

Friday 17 January 2014 16:40 (20 minutes)

Presenters: MUELLER, Anke-Susanne (Max-Planck-Gesellschaft (DE)); REHM, Guenther (Diamond Light Source)

Session Classification: Summary Session

Contribution ID: **45** Type: **not specified**

Dynamics of the microbunching instabilities: studies at PhLAM laboratory in relation with experiments at UVSOR and SOLEIL

Friday 17 January 2014 15:35 (20 minutes)

We present numerical studies the microbunching instability (MBI) in connexion with experiments performed at UVSOR-II and SOLEIL. The focus is made on the spontaneous MBI at SOLEIL, and on laser-induced seeding of the MBI at UVSOR-II. We compare experimental and numerical data using a modeling based on the Vlasov-Fokker-Planck approach. Recent numerical calculations (since mid-2012) were made by implementing a parallel version of the code (MPI/OpenMP). This was necessary for the case of UVSOR-II parameters, for which serial codes would not allow any systematic study in reasonable time, and allowed considerable speedups in the case of SOLEIL. Comparisons between experimental and numerical results allowed to interpret a dynamical frequency that appears in the RF spectrum of bolometer data. We also show how the response to laser perturbations at selected wavenumbers can provide informations on the wavenumber of the MBI insability.

Presenter: ROUSSEL, Eléonore (PhLAM)

Session Classification: CSR Instabilities