Abstract submission

ILD regularly submits abstracts to conferences on ILD and ILD related topics. Please find here a list of recently submitted abstracts, and their status. Once accepted as talks, you will find them under "talks".

Submitted abstracts

W: working
S: submitted
A: accepted
R: rejected

Number	Conference	Title/abstract	submitted on	Status
21	the Rencontres of Vietnam "Windows on the Universe"	Study of the Higgs couplings to leptons and Higgs CP properties at the ILC In the Standard Model the many Yukawa couplings between the Higgs and fermions, responsible for the mass generation for fermions, are predicted to be strictly proportional to the masses of fermions. Any deviation from this prediction would clearly signal new physics beyond the SM. Many alternative ways of introducing Yukawa couplings in BSM models can result in quite different characteristics for different types of fermions, e.g. upper- or down-type, lepton- or quark-type, 3rd-, 2nd- or 1st-generation. More over, if the SM-like Higgs is an admixture of CP even and CP odd states, as preferred in the electroweak baryon genesis models which can potentially explain the baryon number asymmetry in our universe, the Higgs Yukawa couplings will be modified at the tree level. In particular the Higgs to tau tau decay process provides an ideal place for probing the Higgs CP properties. In this talk, we will give the prospects about the measurements of Htautau and Hmumu couplings at the International Linear Collider (ILC), including the Higgs CP phase measurement in Higgs to tautau process using a novel tau reconstruction method. All the simulation studies are performed based on the full detector simulation for the International Large Detector (ILD).	04.06.2018	S
20	he Rencontres of Vietnam "Windows on the Universe"	Search for Light Scalars Produced in Association with a Z boson at the 250 GeV stage of the ILC In many models with extended Higgs sectors, e.g. in Two Higgs Doublet Models, in the NMSSM as well as in Randall Sundrum models, there exists an additional scalar h, which can easily be lighter than the Standard Model (SM) like Higgs. Its coupling to the Z boson is expected to be small if the 125 GeV Higgs boson is SM-like. Such a light scalar with suppressed couplings to the Z boson would have escaped detection at LEP due to its limited luminosity. With a factor of 1000 higher luminosity and polarized beams, the International Linear Collider (ILC) is expected to have substantial discovery potential for such states. Furthermore, searches for additional scalars at LEP and LHC are usually dependent on the model details, such as decay channels. Thus, it is necessary to have a more general analysis with model-independent assumptions. We present a search for a such a light higgs boson produced in association with Z boson at the ILC with a center-of-mass energy of 250 GeV, using the full Geant4-based simulation of the ILD detector concept. In order to be as model-independent as possible, the analysis is performed using the recoil technique, in particular with the Z boson decaying into a pair of muons. Expected exclusion cross section limits for different higgs masses between 10 and 120 GeV will be given in terms of a scale factor with respect to the Standard Model Higgs-strahlung process cross section.	04.09.2018	S
19	he Rencontres of Vietnam "Windows on the Universe"	3rd Generation Quark and Electroweak Boson Couplings at the 250 GeV stage of the ILC The 3rd generation quarks are, due to their large mass, highly sensitive probes for new physics connected to the electroweak symmetry breaking. While top quark pair production requires center-of-mass energies of larger than 350 GeV, the first stage of the ILC at a center-of-mass energy of 250 GeV can perform precision measurements of bottom quark pair production, thereby settling the long standing ~3\sigma tension between the LEP experiments and SLD. For this measurement, the polarised beams of the ILC are of special importance as they enable the separation of the vector and axial-vector couplings of the b quark to Z boson and photon. Another important precision probe for new physics are triple gauge boson coupings (TGCs). Thanks to the polarised beams and the much higher luminosity, a significant increase in precision beyond past and present experiments is expected at the first stage of the ILC for the TGCs involving W bosons. For both measurements, we will report recent projections based on detailed simulations of the ILD detector concept, and highlight the role of important detector performance aspects, e.g. for the separation of b and anti-b jets based on vertex charge measurements and particle ID.	04.10.2018	S
18	ICHEP 2018	Study of the Higgs couplings to leptons and Higgs CP properties at the ILC In the Standard Model the many Yukawa couplings between the Higgs and fermions, responsible for the mass generation for fermions, are predicted to be strictly proportional to the masses of fermions. Any deviation from this prediction would clearly signal new physics beyond the SM. Many alternative ways of introducing Yukawa couplings in BSM models can result in quite different characteristics for different types of fermions, e.g. upper- or down-type, lepton- or quark-type, 3rd-, 2nd- or 1st-generation. More over, if the SM-like Higgs is an admixture of CP even and CP odd states, as preferred in the electroweak baryon genesis models which can potentially explain the baryon number asymmetry in our universe, the Higgs Yukawa couplings will be modified at the tree level. In particular the Higgs to tau tau decay process provides an ideal place for probing the Higgs CP properties. In this talk, we will give the prospects about the measurements of Htautau and Hmumu couplings at the International Linear Collider (ILC), including the Higgs CP phase measurement in Higgs to tautau process using a novel tau reconstruction method. All the simulation studies are performed based on the full detector simulation for the International Large Detector (ILD).	02.27.2018	A
17	ICHEP 2018	Search for Light Scalars Produced in Association with a Z boson at the 250 GeV stage of the ILC In many models with extended Higgs sectors, e.g. in Two Higgs Doublet Models, in the NMSSM as well as in Randall Sundrum models, there exists an additional scalar h, which can easily be lighter than the Standard Model (SM) like Higgs. Its coupling to the Z boson is expected to be small if the 125 GeV Higgs boson is SM-like. Such a light scalar with suppressed couplings to the Z boson would have escaped detection at LEP due to its limited luminosity. With a factor of 1000 higher luminosity and polarized beams, the International Linear Collider (ILC) is expected to have substantial discovery potential for such states. Furthermore, searches for additional scalars at LEP and LHC are usually dependent on the model details, such as decay channels. Thus, it is necessary to have a more general analysis with model-independent assumptions. We present a search for a such a light higgs boson produced in association with Z boson at the ILC with a center-of-mass energy of 250 GeV, using the full Geant4-based simulation of the ILD detector concept. In order to be as model-independent as possible, the analysis is performed using the recoil technique, in particular with the Z boson decaying into a pair of muons. Expected exclusion cross section limits for different higgs masses between 10 and 120 GeV will be given in terms of a scale factor with respect to the Standard Model Higgs-strahlung process cross section.	02.27.2018	A

16	ICHEP 2018	3rd Generation Quark and Electroweak Boson Couplings at the 250 GeV stage of the ILC The 3rd generation quarks are, due to their large mass, highly sensitive probes for new physics connected to the electroweak symmetry breaking. While top quark pair production requires center-of-mass energies of larger than 350 GeV, the first stage of the ILC at a center-of-mass energy of 250 GeV can perform precision measurements of bottom quark pair production, thereby settling the long standing ~3\sigma tension between the LEP experiments and SLD. For this measurement, the polarised beams of the ILC are of special importance as they enable the separation of the vector and axial-vector couplings of the b quark to Z boson and photon. Another important precision probe for new physics are triple gauge boson coupings (TGCs). Thanks to the polarised beams and the much higher luminosity, a significant increase in precision beyond past and present experiments is expected at the first stage of the ILC for the TGCs involving W bosons. For both measurements, we will report recent projections based on detailed simulations of the ILD detector concept, and highlight the role of important detector performance aspects, e.g. for the separation of b and anti-b jets based on vertex charge measurements and particle ID.	02.27.2018	S
15	7th International Conference on High Energy Physics in the LHC era	ILD for the International Linear Collider The International Large Detector (ILD) is a detector concept for the International Linear Collider (ILC), a 250-500 GeV (extendable to 1 TeV) center-of-mass high-luminosity linear electron-positron collider. The ILD is optimized with the concept of particle flow for overall event reconstruction so that it will deliver excellent performance for high-precision Higgs and top measurements, as well as high-sensitivities for possible new phenomena, utilizing the advantages of an electron-positron collider. Particle flow implies that all particles in an event, charged and neutral, are individually reconstructed. This requirement has a large impact on the design of the detector, and has played a central role in the optimisation of the system. Superb tracking capabilities and outstanding detection of secondary vertices are other important aspects. The overall layout, sub-detector technologies, expected performance, and recent progress of the ILD will be presented.	11.15.2017	Modified to a more general talk on ILC
14	CHEF 2017	**Technical instrumentation R&D for ILD large scale device** (V. Balagura for ILD SiW ECAL group, submitted by J.C. Brient)	07.14.2017	A
13		**Cooling system R&D and endocarp geometry** (D. Grondin for ILD SiW ECAL group, submitted by J.C. Brient)		A
12		**Dead zone analysis of ECAL barrel modules under static and dynamic loads** (T. Pierre-Emile for ILD SiW ECAL group, submitted by J.C. Brient)		A
11		**Performance study of SKIROC2/A ASIC for ILD Si-W ECAL** (T. Suehara for ILD SiW ECAL group, submitted by J.C. Brient)		A
10		**ECAL device in view of the ILC staging proposal** (H. Videau for ILD SiW ECAL group, submitted by J.C. Brient)		A
9	IEEE NSS/MIC 2017	**ILD for the International Linear Collider** (submitted by Kiyotomo Kawagoe and Karsten Buesser) The International Large Detector (ILD) is a detector concept for the International Linear Collider (ILC), a 250-500 GeV (extendable to 1 TeV) center-of-mass high-luminosity linear electron-positron collider. The ILD is optimized with the concept of particle flow for overall event reconstruction so that it will deliver excellent performance for high-precision Higgs and top measurements, as well as high-sensitivities for possible new phenomena, utilizing the advantages of an electron-positron collider. Particle flow implies that all particles in an event, charged and neutral, are individually reconstructed. This requirement has a large impact on the design of the detector, and has played a central role in the optimisation of the system. Superb tracking capabilities and outstanding detection of secondary vertices are other important aspects. The overall layout, sub-detector technologies, expected performance, and recent progress of the ILD will be presented. ieee_ILD_v2.pdf	05.08.2017	A (poster)
8	EPS-HEP 2017	**Sensitivity to anomalous VVH couplings at the ILC** (submitted by Tomohisa Ogawa) The discovery of the 125 GeV Higgs boson, which was the last missing element of the standard model (SM), provided us the insight that the electroweak symmetry breaking is done by a Higgs condensate in the vacuum, namely the Higgs mechanism. However the SM does not give the dynamics explaining why and how that Higgs condensate is formed. On the other hand, the SM can not provide candidate particles for the dark matter, and can not explain the baryon number asymmetry in our universe, etc. Therefore new physics beyond the SM is needed to answer all of those questions. Remarkably the effects of new physics will be inevitably imprinted in the properties of the Higgs boson, namely its couplings to other SM particles and its CP nature. At the future International Linear Collider (ILC), one of the most important goals is precise measurement those properties. In this talk, we will focus on the measurement of the general Lorentz structure of couplings between Higgs and vector bosons (VVH, V=Z or W) at the ILC, based on an approach of the effective field theory. The sensitivities to both CP-even and CP-odd dimension-5 operators are evaluated by exploring various Higgs production and decay channels, in particular taking advantage of the sensitivities from differential cross sections measurements. The studies are performed based on full detector simulation of the International Large Detector (ILD), for ECM = 250 GeV and 500 GeV. Combined sensitivities are given for some realistic running scenarios of the ILC.	04.13.2017	A (changed from poster to oral)
7		**Prospects for electroweak precision measurements and triple gauge couplings at a staged ILC** (submitted by Jenny List) In absence of a direct discovery of new particles, precision measurements of the properties of known particles will provide the most powerful probe for phenomena beyond the Standard Model. Future electron positron linear colliders with polarised beams, like the International Linear Collider (ILC), will provide a unique laboratory for such measurements, complementary to hadron colliders. In this contribution, we will review in particular the prospects for electroweak precision measurements, like the mass of the W boson, or the weak mixing angle, as well as for measurements of charged triple gauge couplings based simulations of the ILD detector concept for the ILC. In all of these, the exact knowledge of the beam polarisation and the beam energy plays an important role. Therefore we will also discuss the precision determination of these accelerator parameters from collision data. We will pay special tribute to the most recent discussions concerning a possible first stage of the ILC operating at a center-of-mass energy of 250 or 350 GeV, but also comment of the full ILC running plan.	04.13.2017	A (poster), presenter: Robert Karl
6		**Full simulation study of the process $e^+ e^- \rightarrow b\bar{b}$ at \sqrt(s) = 250 GeV at the ILC** (submitted by Roman Pöschl) The heavy quark doublet plays a central role in the quest for new physics. The complementary between studies of electroweak top quark production and bottom quark production is therefore intuitively clear and pointed out in the literature. Let us remind that the tension between the LEP measurement and the Standard Model prediction of the forward-backward asymmetry A_{fb}^b is still one of the unsolved questions in the field and may be interpreted as a first manifestation of new physics in the heavy quark sector. The process $e^+ e^- \rightarrow b\bar{b}$ at the ILC offers a unique opportunity for a final word on the tension. Polarised beams allow for a large disentangling of the coupling constants or form factors that govern the $\gamma/Z \,b\bar{b}$ vertex. The contribution will present a detailed simulation study of the process $e^+ e^- \rightarrow b\bar{b}$ at 250\, GeV with the ILD Detector. Besides the phenomenological implications, the contribution will demonstrate that with a careful analysis of the final state the charge of the b-quarks can be determined on an event-by-event basis with the ILD Detector. Such a capability is unprecedented by past and present particle physics experiments.	04.13.2017	A (poster), presenter: Sviatoslav Bilokin

5		**Naturalness and light Higgsinos: why ILC is the right machine for SUSY discovery** (submitted by Jacqueline Yan) Radiatively-driven natural Supersymmetry, a theoretically and experimentally well-motivated framework, centers around the predicted existence of four light, nearly mass-degenerate Higgsinos with mass $\sim 100-200$ GeV (not too far above m_Z). Their small mass splittings of at most 20 GeV implies very little visible energy of accompanying Standard Model particles decayed from heavier Higgsinos. Given that other SUSY particles are considerably heavy, this makes detection challenging at hadron colliders. On the other hand, the clean environment of an electron-positron collider with $\sqrt{s}>2m_{Higgsino}$ would enable a decisive search of these required Higgsinos, and thus either the discovery or exclusion of natural SUSY. We present a detailed simulation study of precision measurements of Higgsino masses and production cross sections at $\sqrt{s}$ = 500 GeV of the proposed International Linear Collider currently under consideration for construction in Japan. The study is based on a Geant4 simulation of the International Large Detector concept. We examine several benchmark points just beyond the HL-LHC reach, with a mass spectrum containing four light Higgsinos directly accessible by the ILC, and the mass differences between the lightest SUSY particle and the heavier states ranging from about 4 to 20 GeV. It can be shown that their masses and production cross sections are able to be precisely measured to approximately 1% precision or better. These precise measurements allow for extracting the underlying weak scale SUSY parameters. The fitted parameters give predictions for the masses of heavier SUSY states, which provide motivation for future high-energy colliders. Additionally, dark matter properties may be derived. Evolution of the measured gaugino masses to high energies should allow one to distinguish the hypothesis of gaugino mass unification from other compelling possibilities such as mirage mediation.	03.31.2017	A, speaker: Suvi-Leena Lehtinen
4	ALPS2017	**Natural SUSY at the ILC: from MZ to the GUT scale** (submitted by Mikael Berggren) The most basic requirement for naturalness in supersymmetric models is the existence of rather light partners of the Higgs boson, the Higgsinos, at masses not too far above M_Z. Despite the pressure from LHC data on the simplest high-scale models (like the cMSSM), such light Higgsinos can still be realised in different types of GUT-scale models from NUHM2 to mirage unification models. The ILC will offer the unique discovery potential for the elusive higgsino particles and allow for precision measurements of their properties. In this contribution, prospects for the achievable precisions for masses, the very small mass splittings and polarised production cross sections will be presented. Based on these, we studied the possibilities to determine the SUSY parameters at the weak scale, and to extrapolate their running to the GUT scale. We will discuss the prospects to thereby differentiate between various GUT-scale models and SUSY breaking schemes and to predict the masses of the remaining SUSY particles. In particular the latter could provide important guidance for the energy scale of the next hadron collider after the LHC.	02.13.2017	A
3		**Scalar sector at future e+e- colliders** (submitted by Ivanka Bozovic-Jelisavcic) Future e+e- colliders offer excellent possibilities for precision studies in the Higgs sector due to the clean experimental conditions and low backgrounds compared to hadron colliders. At lower energies i.e. below 500 GeV, the Higgstrahlung is the dominant Higgs production mechanism. With the recoil mass analysis technique being the unique feature of e+e- colliders, the Higgstrahlung allows model-independent studies of the Higgs couplings as well as the access to the invisible Higgs decays. If considered simultaneously with WW-fusion dominating Higgs production at higher energies, determination of the Higgs total width is possible at a percent level. Scalar sector searches are reviewed for ILC and CEPC using recent research updates obtained with the fully simulated ILD and CEPC detectors.	02.01.2017	A, speaker: Junping Tian
2		**ILD for the International Linear Collider** (submitted by Kiyotomo Kawagoe) The International Large Detector (ILD) is a detector concept for the International Linear Collider (ILC), a 250-500 GeV (extendable to 1 TeV) center-of-mass high-luminosity linear electron-positron collider. The ILD is optimized with the concept of particle flow for overall event reconstruction so that it will deliver excellent performance for high-precision Higgs and top measurements, as well as high-sensitivities for possible new phenomena, utilizing the advantages of an electron-positron collider. Particle flow implies that all particles in an event, charged and neutral, are individually reconstructed. This requirement has a large impact on the design of the detector, and has played a central role in the optimisation of the system. Superb tracking capabilities and outstanding detection of secondary vertices are other important aspects. The overall layout, sub-detector technologies, expected performance, and recent progress of the ILD will be presented.	01.17.2017	R (Our abstract is merged with that of CLICdp for a more general talk.)
1	Instrumentation 2017	**ILD for the International Linear Collider** (submitted by Kiyotomo Kawagoe) The International Large Detector (ILD) is a detector concept for the International Linear Collider (ILC), a 250-500 GeV (extendable to 1 TeV) center-of-mass high-luminosity linear electron-positron collider. The ILD is optimized with the concept of particle flow for overall event reconstruction so that it will deliver excellent performance for high-precision Higgs and top measurements, as well as high-sensitivities for possible new phenomena, utilizing the advantages of an electron-positron collider. Particle flow implies that all particles in an event, charged and neutral, are individually reconstructed. This requirement has a large impact on the design of the detector, and has played a central role in the optimisation of the system. Superb tracking capabilities and outstanding detection of secondary vertices are other important aspects. The overall layout, sub-detector technologies, expected performance, and recent progress of the ILD will be presented.	12.12.2016	R (T. Omori gives a more general talk on behalf of LCC: "Status and Future Perspectives of the ILC Project: Accelerator / Detector R&D".)