Francois Bouchet

Title: Cosmology with the Planck satellite: from quantum foam to the cosmic web

Abstract:
Sketched out in 1992, selected by ESA in 1996, and launched in 2009, the Planck satellite was shut off in 2013, after a measuring mission that exceeded all expectations. The Planck collaboration delivered a first set of cosmological data and results in March 21st 2013, and the full set in February 2015. Part of the data delivery is a "definitive" map of the anisotropies of the Cosmic Microwave Background (CMB), its angular power spectrum together with their full statistical characterisation. The 2015 delivery also includes pioneering polarisation data. I will described the results we obtained so far from temperature and polarisation data, both in terms of content of the universe and of characteristics of the primordial fluctuations.

Will Percival

Title: Cosmological Measurements from Galaxy Clustering

Abstract: Large surveys of the angular positions and redshifts of galaxies provide a wealth of cosmological information about the late-time Universe and its accelerating expansion. In this talk I will review the physical mechanisms that encode this information in the observed clustering of galaxies, and present recent results from the Baryon Oscillation Spectroscopic Survey (BOSS). I will then look ahead to future surveys including the extended Baryon Oscillation Spectroscopic Survey (eBOSS), Dark Energy Spectroscopic Instrument (DESI) and the ESA Euclid satellite mission, showing how they will revolutionise our understanding of cosmic acceleration.

Andrei Frolov

Title: Isotropy and statistics of the CMB with Planck

Abstract:
I will talk about tests of the statistical isotropy and Gaussianity of the cosmic microwave background (CMB) an isotropies using observations made by the Planck satellite. The results are based on the full Planck mission for temperature, and also include some polarization measurements. I will also highlight map stacking as a statistical tool for studying polarized CMB and dust emission maps.

Daisuke Yamauchi

Title:Cosmology with the Square Kilometre Array by SKA-Japan

Abstract:
The future world's largest radio telescope, Square Kilometre Array (SKA), will be able to open the new frontier of cosmology and will be one of the most powerful tools for cosmology in the next decade. The cosmological surveys conducted by the SKA would have the potential not only to answer the fundamental questions in cosmology but also deliver the precision cosmology. In this talk, I will briefly review the cosmological surveys

conducted by the SKA and discuss the cosmology science led by SKA-Japan consortium cosmology science working group.consortium cosmology science working group.

Mark Trodden

Title: Theoretical Aspects of Cosmic Acceleration

Abstract:
I will discuss theoretical constraints on constructing viable theories of cosmic acceleration. Working in the effective field theory language, and focusing particularly on attempts to modify gravity, I will explain how many attempts fall foul of these constraints, and the general rules for avoiding such pitfalls. The resulting screening mechanisms have a number of important consequences for theories of cosmic acceleration.

Qaisar Shafi

Title: Primordial Monopoles, Proton Decay and GUT Inflation

Abstract:TBA

Surhud More

Title:The structure and large scale distribution of dark matter halos: Overview and new horizons

Abstract:
Dark matter halos are the basic building blocks that form the large scale structure in the Universe. I will present an overview of our knowledge about the internal structure of these halos, their large scale distribution, and the connection between the two, based on numerical simulations of cold dark matter in the concordance cosmological model. I will talk about some of the recent theoretical developments regarding the physical boundaries of dark matter halos, and their connection to the assembly history of these halos. I will present observational evidence supporting these new developments. In particular, I will highlight the recent detections of halo assembly bias on galaxy cluster scales, and the edges of galaxy clusters, and how these advances will help us to further our understanding of galaxy formation and the challenges they present to cosmological inferences.

Naoki Yoshida

Title: Simulations of the formation of large-scale structure

Abstract:
We present the results of a suite of cosmological simulations both with dark matter only and with baryonic physics of galaxy formation. We aim at using the outputs to derive statistical quantities needed for analyzing data from large observational programs such as

HSC survey. We are particularly interested in cross-correlation studies of weak lensing, X-ray, SZ, gamma-ray observations. We present preliminary results using the actual observational data, as well as theoretical forecast. Finally, we report the development of cosmological simulations with zero particles, which directly follow the evolution of the velocity distribution function.

Justin Khoury

Title: Dark Matter Superfluidity

Abstract:
I will discuss a novel theory of dark matter superfluidity that matches the successes of the LambdaCDM model on cosmological scales while simultaneously reproducing the MOND phenomenology on galactic scales. The dark matter and MOND components have a common origin, representing different phases of a single underlying substance.

Takaya Ohashi

Title: X-ray study of the dark side of the universe

Abstract:
A review will be given about X-ray studies of the dark components in the universe. Clusters of galaxies are very useful objects in constraining the dark energy and dark matter properties, based on their distribution over the cosmological timescales and on their dynamical and spectral properties. The low background of Suzaku has made unique contribution in the X-ray study of cluster outskirts. Dark baryons also carry important information about the thermal and chemical evolution of the universe, and future X-ray observations can reveal majority of this component. The next X-ray observatory ASTRO-H will be launched in early 2016. The satellite carries both high-resolution spectroscopy instrument, microcalorimeters, and sensitive hard X-ray/gamma-ray detectors. The status of satellite will be reported, and expected results in connection with the dark side of the universe will be described.

Kunihito Ioka

Title: Bright Side of the High Energy Universe

Abstract:
In this talk, I will review the bright side of the high energy universe, in particular the latest observations of charged cosmic rays, and discuss the astrophysical origins and their implications for dark matter searches.

Shigeki Matsumoto

Title: Towards testing the WIMP paradigm

Abstract:

We will develop a framework to test the WIMP paradigm without depending on any specific new physics models. We will demonstrate how well the framework works with particularly focusing on a singlet-like fermionic WIMP, and discuss how severely present dark matter search experiments put constraints on the WIMP. We also mention what kind of future dark matter searches could cover regions survived until today.

Yu-Feng Zhou

Title:Implications of the AMS-02 data for dark matter and cosmic-ray propagation

Abstract:
A major source of uncertainties in the predictions for cosmic-ray antiparticle fluxes from dark matter annihilation/decay is the degeneracy between the diffusion coefficient and the height of the diffusion halo. We show that the degeneracy can be lifted by the combined measurement on B/C flux ratio and proton flux (without including the ratio of Beryllium isotopes), which allows for an improved determination of the cosmic-ray propagation parameters using the AMS-02 data alone. The uncertainties in the dark matter induced antiproton flux due to the propagation models can be reduced by an order of magnitude. We show that due to the reduced uncertainties the upper limits from the latest AMS-02 antiproton data turned out to be compatible with that from the Ferm-LAT gamma-ray data on the dwarf spheroidal satellite galaxies.

Masahiro Morii

Title:Dark Matter Searches at the LHC

Abstract:
The Large Hadron Collider (LHC) provides a unique opportunity for detection of man-made Dark Matter particles produced in proton-proton collisions. I will review recent results of Dark Matter searches by the ATLAS and CMS experiments, and present prospects for future measurements.

Howard Baer

Title: SUSY dark matter, axions, LHC and ILC

Abstract:
The SUSY thermal WIMP paradigm now seems nearly excluded by a combination of direct/indirect/LHC searches combined with calculations of the relic abundance. SUSY that naturally generates the weak scale instead yields up a higgsino-like LSP with a thermal under-abundance of dark matter. Extending naturalness to the QCD sector requires the axion so one obtains mixed axion-wimp dark matter. In the SUSY DFSZ axion model, one also gains a solution to the SUSY mu problem and generates a natural little hierarchy with mu<<m32. The required light higgsinos with mass ~100-200 GeV are difficult to see at LHC but instead require the unique features of the ILC which in this case will be a higgsino factory in addition to a Higgs factory. Ultimately, we expect detection of both WIMP and axion dark matter particles.

Leszek Roszkowski

Title: SUSY dark matter: lessons from and for the early Universe

Abstract:
I will present the status of supersymmetric neutralino as dark matter in the aftermath of the Higgs boson discovery and improved searches for supersymmetry and dark matter. A potential detection of a WIMP signal in one or more detection search channels may, depending on the mass and detection cross-section of the detected WIMP, give us some vital information about post-inflationary conditions in the early Universe. Other SUSY candidates will also be briefly discussed.

Shaaban Khalil

Title: Dark Matter in Non-Minimal SUSY Models

Abstract:
We show that the combined LHC (Higgs mass limit and gluino mass lower bound) and relic abundance constraints rule out most of the MSSM parameter space except a very narrow region with very large $\tan\beta$ ($\sim$50). Therefore we consider TeV scale B-L supersymmetric extension of the standard model with inverse seesaw, which also has other captivating features, like offering an explanation for neutrino masses and relieving the small hierarchy problem of the MSSM. We show that in this class of models there are four additional candidates for dark matter in comparison to the MSSM: two kinds of neutralino and right-handed CP-even and -odd sneutrinos. We argue that a mostly right-handed sneutrino is a viable dark matter candidate.

Paolo Gondolo

Title: Halo-Independent Analysis of Direct Dark Matter Experiments

Abstract:
Direct dark matter searches look for the scattering of dark matter particles from the galactic halo off nuclei in laboratory detectors. A host of apparently contradictory experimental results have been accumulated over the years, in particular an annual modulation with the predicted characteristics of a dark matter signal, and upper limits stronger than the claimed detection. A natural question is if there is a dark matter model for which all of these experiments are compatible. In this talk, I will overview so-called halo-independent methods that compare direct detection experiments independently of the dark matter velocity distribution and local density, and I will present current halo-independent results and open issues.

Shigetaka Moriyama

Title: Direct dark matter searches with XMASS

Abstract:
XMASS-I detector has the largest liquid xenon target mass of 830kg
to search for dark matter. It also has the largest photoelectron yield among the liquid

xenon detectors as densely packed photomultipliers directly surround the target. This allows for a low energy threshold to search for energy deposition via nuclei as well as to electrons. With this unique detector, various searches for dark matter were conducted. Recently a search for annual modulation in more than one year of the data was performed including electron signals just as DAMA. Future plans for the XMASS project will also be presented.

Sara Diglio:

Title: XENON1T: the start of a new era in the search for Dark Matter

Abstract:
Cosmological observations and the dynamics of the Milky Way provide strong evidence for an invisible and dominant mass component, that so far reveals its presence only by its gravitational interaction. If the dark matter is made of Weakly Interacting Massive Particles (WIMPs), it can be directly detected via elastic scattering from nuclei in ultra-low background, deep-underground detectors. WIMPs arise naturally in beyond standard model theories, a popular example being the neutralino, or the lightest supersymmetric particle. After an introduction to the direct dark matter detection method, I will review where the field is today and the prospects for advancement promised by the next generation of experiments using massive detectors. The first among these experiments is XENON1T at the National Laboratory of Gran Sasso, Italy. Data-taking with XENON1T is projected to start in Spring 2016. The design characteristics and its scientific reach will be covered in details.

Aldo Morselli

Title:Current and future gamma-ray observations from KeV to TeV

Abstract:
Indirect dark matter (DM) searches rely on detection of stable by-products of DM interactions to search for a signal of this elusive component of the Universe. Among these final products, gamma rays have recently played a major role in understanding the nature of the DM particle. This talk reviews the current status of indirect DM searches with gamma-ray observations and prospects with future instruments.

Carlos Munoz

Title:Searching for SUSY and decaying gravitino dark matter at the LHC and Fermi-LAT with the μvSSM

Abstract:
Gravitinos are well-known candidates for dark matter in SUSY scenarios. This is the case of the R-parity violating “μ from v” Supersymmetric Standard Model (μvSSM) where simply using right-handed v’s the μ problem is solved while simultaneously the origin of neutrino masses is explained. Since the violation of R-parity renders the gravitino unstable, it is possible to search for it with gamma-ray observations at the Fermi LAT. Besides, novel signatures of SUSY at the LHC may also be present through the new states of the model.

Keith Olive

Title: Supersymmetric Dark Matter or Not

Abstract:
The absence of low energy supersymmetry in run I data at the LHC has pushed the nominal scale for supersymmetry beyond a TeV. While this is consistent with the discovery of the Higgs boson at \approx 125 GeV, simple models with scalar and gaugino mass universality are being pushed into corners of parameter space. Some possibilities for supersymmetric models which incorporate radiative electroweak symmetry breaking with a wino, Higgsino, or bino LSP are discussed. In contrast, non-supersymmetric grand unified theories such as SO(10) may also provide a dark matter candidate. Because of the presence of an intermediate scale, these theories may unify gauge couplings, provide for neutrino masses and a suitably long lived proton.

Kiwoon Choi

Title:Hierarchical axion scales for natural inflation and relaxion

Abstract:Axion-like fields provide a natural candidate for an inflaton solving the fine tuning problems of the big-bang cosmology, or the relaxion which may solve the gauge hierarchy problem. On the other hand, both the axionic inflaton and the relaxion are required to have dimensionful couplings with a big hierarchy. We discuss a novel scheme to generate a big hierarchy in axion scales, without introducing a fine tuning of continuous parameters or an unreasonably large number of degrees of freedom.

Yann Mambrini

Title: Building phenomenological models of Dark Matter

Abstract:
Recently, several groups or experimental collaborations claimed direct or indirect signals of dark matter. From keV to PeV scale, the familiar supersymmetric/WIMP models are unable to explain such excesses. In this situation, it is interesting to see how one can build minimal dark extensions of the Standard Model in a coherent framework (SO(10), Higgs/Z-portal..) and in the meantime how to conciliate these signals with a thermal history of the Universe including a dark matter candidate.

Shigeru Yoshida

Title: Exploring the origin of UHECRs with very-high energy neutrinos
-- The IceCube 7year long Ultra-high energy neutrino searches --

Abstract: TBA

Joern Kersten

Title:Not So Weakly Interacting Dark Matter Bonding with Sterile Neutrinos

Abstract:Despite the success of the standard LambdaCDM cosmological scenario, there is evidence for a tension with observations. For example, the observed properties of relatively small galaxies do not quite agree with the predictions by simulations of structure formation. Besides, recent observations of the galaxy cluster Abell 3827 indicate dark matter (DM) self-interactions. I will review a simple particle physics scenario containing cold DM and sterile neutrinos. Both are charged under a new gauge interaction. The resulting DM self-interactions and DM-neutrino interactions resolve the problems with structure formation, while the neutrino-neutrino interactions allow consistency with cosmological bounds. The sterile neutrinos can account for the neutrino anomalies found in short-baseline experiments and for a small hot DM component.

Pyungwon Ko

Title:EW scale DM models with dark gauge symmetries

Abstract:
In this talk, I describe a class of EW scale DM models whereDM is absolutely stable or long-lived due to some dark gauge symmetries. Generic features of these models include dark Higgs and dark gauge bosons, in addition to DM particles. I discuss a few examples how these dark Higgs and dark gauge bosons can play important roles in Higgs boson and DM phenomenology and cosmology.

Mihoko Nojiri

Title: Physics of Dark Matter and Universe in LHC era

Abstract: TBA