October 1, 2008

ABSTRACTS FOR CONTRIBUTED TALKS
DESY Theory Workshop
29 Sept.–2 Oct. 2008

1. Probing Hidden Sector Photons through the Higgs Window

Ahlers, Markus

Rudolf Peierls Centre for Theoretical Physics, 1 Keble Road, Oxford, OX1 3NP, United Kingdom

We investigate the possibility that a (light) hidden sector extra photon receives its mass via spontaneous symmetry breaking of a hidden sector Higgs boson, the so-called hidden-Higgs. The hidden-photon can mix with the ordinary photon via a gauge kinetic mixing term. The hidden-Higgs can couple to the Standard Model Higgs via a renormalizable quartic term - sometimes called the Higgs Portal. We discuss the implications of this light hidden-Higgs in the context of laser polarization and light-shining-through-the-wall experiments as well as cosmological, astrophysical, and non-Newtonian force measurements. For hidden-photons receiving their mass from a hidden-Higgs we find in the small mass regime significantly stronger bounds than the bounds on massive hidden sector photons alone.

Related papers: arXiv:0807.4143

2. Nonequilibrium Dynamics of Scalar Fields in a Thermal Bath

Anisimov, Alexey

DESY, Theory Group, Notkestrasse 85, D-22603 Hamburg

We study the approach to equilibrium for a scalar field which is weakly coupled to a thermal bath. Our analysis of the initial value problem is based on Kadanoff-Baym equations which are shown to be equivalent to a Langevin equation. The time evolution of the statistical propagator is compared with solutions of the Boltzmann equations.

Related papers:

3. Dark Matter Candidates Based upon non Standard Neutrino Astro Physics

Beckwith, Andrew

Fermilab, P.O. Box 500, Batavia, IL 60510-5011, USA

Symmetry breaking is presented as a common denominator with new neutrino physics, a new candidate for an axion as initially reported by Meissner and Nicolai in a new 2008 PRL letter they publicized, and Subir Sarkar‘s supposition of irregularities in the CMBR

spectra. The author believes that the new neutrino physics so presented is linked to CMBR traces which also account for the initial onset of entropy in the early universe.

Related papers: arXiv:0712.0029

4. Light DM and various bounds on its properties

Boyarsky, Alexey and Ruchayskiy, Oleg

ETH Zürich, CERN, Switzerland and EPFL, France

In this talk we review DM candidates with masses in keV-MeV range, and non-thermal primordial spectra (sterile neutrinos, gravitino, etc.). We discuss production mechanisms of these particles and various restrictions on their parameters: from searches for the decay lines, from analysis of Lyman-alpha forest, and from the phase-space density considerations.

Related papers:

5. Dark matter Annihilation Signal in gamma Rays – the Importance of Radiative Corrections

Bringmann, Torsten

Stockholm University, Dept. of Physics, SE-106 91 Stockholm

Being able to safely distinguish astrophysical from potential dark matter (DM) annihilation signals is of utmost importance for indirect DM searches. To this end, one has to rely on distinctive – and unique – spectral signatures to look for. In this talk, I point out that internal bremsstrahlung, which is unavoidable in the presence of charged annihilation products, provides such a signature. In fact, it often even dominates the gamma-ray spectrum expected from DM annihilation, demonstrating that radiative corrections can significantly exceed naive expectations; for a large part of the WIMP parameter space internal bremsstrahlung, furthermore, turns out to be more important for indirect DM searches than the traditionally looked-for line signals. The gamma-ray contributions reported here may therefore be of great importance for upcoming observatories like the soon to be launched GLAST satellite or the new generation of Air Cherenkov Telescopes. I illustrate in some detail the situation for neutralino DM in mSUGRA and the MSSM, but also briefly mention other DM candidates such as the lightest Kaluza-Klein particle appearing in models with universal extra dimensions. Finally, I comment on the potential of using these signatures to gain further insight into the nature of the DM.

Related papers: arXiv:0710.3169

6. Doubly Coexisting Dark Matter Candidates in an Extended Seesaw Model

Cheon, Hwa Sung

Yonsei Univ., 315-A, Shinchon-dong, Seodaemun-gu, Seoul, Republic of Korea

We examine how a scenario of coexisting two-particle dark mater can be realized in the extended seesaw model, which we have proposed previously to accommodate small neutrino masses and low scale leptogenesis. In this scenario, we now impose the discrete symmetry $Z_2 \times Z_2'$ and introduce new interaction terms with dimension 5 so as for singlet Majorana neutrino S and singlet scalar Φ to be doubly coexisting dark matter candidates. Depending on the mass spectrum of the two dark matter candidates, the annihilation process either $SS \longrightarrow \Phi\Phi$ or $\Phi\Phi \longrightarrow SS$ is of particular interest because the annihilation cross sections for the processes can be so large that the relic abundance of decaying particle should get lowered, which in turn makes the constraints on its parameter space relaxed, compared with the case of one and only one dark matter candidate. We discuss the implications of the dark matter detection through the scattering off the nucleus of the detecting material on our scenarios for dark matter candidates. We also study the implications for the search of invisible Higgs decay at LHC, which may serve as a probe of our scenario for dark matter.

Related papers: arXiv:0807.0981 [hep-ph]

7. Dark Energy and the Interior of a Black Hole

Culetu, Hristu

Ovidius University, Bdul Mamaia 124, Dept. of Physics, Constanta, Romania

A model for dark energy as a compressible, anisotropic fluid is proposed, in a time dependent spacetime which is a solution of Einstein's' equations with an anisotropic stress tensor as source. The model leads to a time dependent cosmological constant. The energy density ρ of the fluid is proportional to $1/t^2$ (with the pressure $p = -\rho$) but its Brown - York quasilocal energy equals the Yu - Caldwell expression for the interior energy of a black hole.

Related papers: hep-th/0701255 ; 0711.0062 [hep-th]

8. Cosmic Gamma-Ray Background Anisotropies and Dark Matter Annihilation

Cuoco, Alessandro

Univ. of Aarhus, Dept. of Phys. and Astron., Ny Munkegade, Bygn. 1520, DK- 8000 Aarhus, Denmark

The extragalactic cosmic gamma-ray background (CGB) can provide signatures of Dark Matter Annihilation (DMA) not only through the imprint in the energy spectrum but also through the peculiar pattern and intensity of its anisotropies. These are expected to differ significantly with respect to a pure astrophysical origin of the CGB due to the

peculiar quadratic dependence of the DMA signal on the DM density. I will discuss the DM signature expected in the power spectrum of the CGB anisotropies and the prospect for detection with the GLAST observatory.

Related papers: arXiv:0710.4136

9. Sneutrino LSPs in R-Parity Violating Minimal Supergravity Models

Das, Siba Prasad

Physikalisches Institut, Univ. Bonn, Nussallee 12, D-53115 Bonn

We consider the minimal supergravity model (mSUGRA) with one additional R-Parity violating operator at the GUT scale. The superparticles mass spectrum at the weak scale are generally altered due to the presence of the R-Parity violating coupling in the renormalization group equations. We show that a lepton number violating coupling at the GUT scale can lead to a sneutrino as the lightest supersymmetric particle (LSP) in a large region of parameter space. We then study the phenomenology of these sneutrino LSP models. We take into account the restrictions from the muon anomalous magnetic moment and other precision measurements. We also give examples for characteristic signatures at the LHC.

Related papers:

10. Thermal Right-Handed Sneutrino Dark Matter in the F_D-Term Model of Hybrid Inflation

Deppisch, Frank

School of Physics and Astronomy, Univ. of Manchester, Oxford Road, Manchester M13 9PL, United Kingdom

We compute the relic abundance of the right-handed sneutrinos in the supersymmetric F_D-term model of hybrid inflation. As well as providing a natural solution to the mu- and gravitino overabundance problems, the F_D-term model offers a new viable candidate to account for the cold dark matter in the Universe: the lightest right-handed sneutrino. In particular, the F_D-term model predicts a new quartic coupling of purely right-handed sneutrinos to the Higgs doublets that thermalizes the sneutrinos and makes them annihilate sufficiently fast to a level compatible with the current cosmic microwave background data. We analyze this scenario in detail and identify favourable regions of the parameter space within the framework of minimal supergravity, for which the lightest right-handed sneutrino becomes the thermal dark matter, in agreement with WMAP observations of cosmological inflation. Constraints derived from direct dark matter searches experiments are presented.

Related papers: arXiv:0808.0490

11. Inflaton Decay: The Role of Thermal Masses

Drewes, Marco

DESY, Theory, Notkestraße 85, D-22607 Hamburg

In a plasma elementary excitations of quantum fields obtain effective masses due to the interactions with virtual particles from the plasma. If the resonances are narrow and can be regarded as quasiparticles the decay of a heavy particle in a plasma can be suppressed above a critical temperature when the sum of the thermal masses of its decay products exceeds its own effective mass. This can put an upper bound on the reheating temperature in the early universe. Nevertheless no model independent statement can be deduced therefrom because off-shell decays and scattering processes similar to Landau damping can offer channels to circumvene such a bottleneck.

Related papers:

12. Solving the η-Problem in Hybrid Inflation with Heisenberg Symmetry and Stabilized Modulus

Dutta, Koushik

Max Planck Institute for Physics, Föhringer Ring 6, D-80805 München

We propose a class of models in which the η-problem of supersymmetric hybrid inflation is resolved using a Heisenberg symmetry, where the associated modulus field is stabilized and made heavy with the help of the large vacuum energy during inflation without any fine-tuning. The proposed class of models is well motivated both from string theory considerations, since it includes the commonly encountered case of no-scale supergravity Kaehler potential, and from the perspective of particle physics since a natural candidate for the inflaton in this class of models is the right-handed sneutrino which is massless during the inflationary epoch, and subsequently acquires a large mass at the end of inflation. We study a specific example motivated by sneutrino hybrid inflation with no-scale supergravity in some detail, and show that the spectral index may lie within the latest WMAP range, while the tensor-to-scalar ratio is very small.

Related papers: arXiv:0808.2425

13. Material Screening and Background Expectations for the Xenon100 Experiment

Ferella, Alfredo Davide

Zürich Univ., Physik-Institut, Wintherthurerstr. 190, CH-8057 Zürich

After the promising results of the XENON10 experiment, a new double phase (liquid-gas) xenon filled TPC detector has been designed and built for the direct detection of WIMPs in the galactic halo. In this talk the screening of the material used for the construction of the detector will be presented and the expected background according to the screening results discussed.

Related papers:

14. Neutrino Signals from Gravitino Dark Matter with Broken R-Parity

Grefe, Michael

DESY, Theory Group, Notkestrasse 85, D-22603 Hamburg

The gravitino is a viable supersymmetric Dark Matter candidate, which does not have to rely on strict R-parity conservation. In fact even with some small R-parity breaking, the gravitinos are sufficiently long-lived to be still around as Dark Matter and the cosmological scenario is consistent with primordial nucleosynthesis and the high reheating temperature needed for thermal leptogenesis. In this talk we look at the neutrino flux from gravitino decay in a scenario with bilinear R-parity breaking and we have a look at the possibility to detect such signal in the present and future neutrino experiments. The detection of a signal in both gamma-rays and neutrinos would be a strong signature of decaying gravitino CDM.

Related papers: arXiv:0809.5030 [hep-ph]

15. Influence of Neutrino Processes on Giant Flare from SGR

Gvozdev, Alexander

Yaroslavl State Univ., Sovietskaya 14, 150000, Yaroslavl, Russia

A giant flare from Soft Gamma Repeater (SGR) is interpreted as a radiation from the highly magnetized plasma envelope of a special type neutron star called magnetar. A sensitivity of radiation energy losses induced by this plasma to processes with the neutrino emission is investigated and the neutrino emissivity in dominant channels is calculated. Two cases for the plasma envelope are considered: a hot magnetized electron-positron plasma (the magnetar model) with the magnetic field strength inside larger than the critical one $H_c \sim 10^{13}$ G and the moderately degenerate ($\mu/T \sim 3-4$) magnetized electron-positron plasma with a baryon contamination. Limitations on the magnetic field strength from neutrino cooling rates are obtained in both models. In the framework of the magnetar model, a moderate neutrino cooling requires the magnetic field strength $H \sim 10^{16}$ G which is more than one order of magnitude larger than that typically assumed in magnetars. In the second model, restrictions on the magnetic field strength are weaker and depend on the baryon density in the envelope. To get a satisfactory model of the giant flare from the SGR, it is necessary to take into account the baryon contamination of the magnetized electron-positron plasma in the envelope.

Related papers:

16. Detecting effects of trans-planckian physics with cosmological precision measurements

Hamann, Jan

LAPTH, BP 110, 9 Chemin de Bellevue, 74941 Annecy-le-Vieux Cedex, France

New physics at energies beyond the Planck scale may leave traces in the curvature perturbations generated during inflation. I will address the question under which conditions these traces can be detected by planned future experiments. In particular I will discuss what kind of constraints can be expected by probing the primordial spectra via CMB anisotropies, large-volume galaxy redshift surveys and surveys of the distribution of neutral hydrogen using the 21cm spin-flip line.

Related papers: arXiv:0807.4528; (accepted by JCAP)

17. Neutrino as a Dark Matter Candidate in Leptophobic Z' Model

Kim, Choong Sun

Yonsei University, Seoul 120-749, Korea

We consider the exclusive flavor changing neutral current processes $B \to M\nu\bar{\nu}$ ($M = \pi, K, \rho, K^*$) in the leptophobic Z' model, in which the charged leptons do not couple to the extra Z' boson. We find that these exclusive modes are very effective to constrain the leptophobic Z' model. In the leptophobic Z' model, additional right-handed neutrinos are introduced and they can contribute to the missing energy signal in $B \to M+$ missing energy decays. Through explicit calculations, we obtain quite stringent bounds on the model parameters, $|U_{sb}^{Z'}| \leq 0.29$ and $|U_{db}^{Z'}| \leq 0.61$, from already existing experimental data. We also briefly discuss an interesting subject of massive right-handed neutrinos, which might be connected with the dark matter problem.

Related papers: hep-ph/0602156

18. Neutralino Dark Matter in an SO(10) Model with Intermediate Scale Symmetry Breaking

Kim, Ju Min

Physikalisches Institut der Rheinischen Friedrich-Wilhelms-Univ. Bonn, Nussallee 12, D-53115 Bonn

We consider a SUSY GUT based on the gauge group SO(10) suggested by Aulakh et al., which features two step intermediate symmetry breaking. We analyze the differences in the low energy phenomenology compared to that of mSUGRA. We find that thermal neutralino Dark Matter remains viable in this scenario, although the allowed region is even more highly constrained than that in mSUGRA.

Related papers:

19. Neutralino Annihilation to Quarks with SUSY-QCD Corrections

Kovarik, Karol

Laboratoire de Physique Subatomique et de Cosmologie, France

The calculation of the cosmological relic density of the dark matter candidate within supersymmetric models is an interesting possibility to obtain additional constraints on the supersymmetric parameter space with respect to collider, electroweak precision, and low-energy data. In most scenarios, the dark matter candidate is the lightest neutralino. The calculation of its relic density involves its annihilation cross section, where many processes contribute. For most of them, no (or at least not the full) corrections at $O(\alpha_s)$ have been published so far. However, in the light of future cosmological precision measurements such as by the Planck mission, these corrections can be important in QCD and also in SUSY-QCD. We present QCD and SUSY-QCD corrections to neutralino pair annihilation into quark-antiquark pairs. We present analytical results and numerically evaluate their impact on the neutralino annihilation cross section. We also compute numerically the neutralino relic density including the corrections and identify favoured and disfavoured regions with respect to cosmological data in the parameter space of the mSUGRA model.

Related papers:

20. Constraints on Neutralino Masses and Mixings From Cosmology and Collider Physics

Langenfeld, Ulrich

DESY Zeuthen, Theory Group, Platanenallee 6, D-15738 Zeuthen

I present bounds on the mass of the lightest neutralino from cosmology and collider physics.

Related papers:

21. Spectral Function of Majorana Neutrino in a Thermal Bath

Mendizabal, Sebastian

DESY, Theory Group, Notkestrasse 85, D-22603 Hamburg

We study the properties of massive Majorana neutrinos which interact with a thermal bath of leptons and Higgs particles. The spectral function for the Majorana neutrinos is calculated by solving the Kadanoff-Baym equations. This method can be applied to the study of different scenarios, such as CP-violating processes and Leptogenesis.

Related papers:

22. Baseline Dependence of Active-sterile Neutrino Mixing in the Presence of Extra-dimensional Shortcuts

Micu, Octavian

Univ. Dortmund, Otto-Hahnstr. 4, D-44221 Dortmund

A possible resonance in active-sterile neutrino oscillations arising in theories with large extra dimensions. A scenario with a warped extra dimension is considered, and the neutrino oscillation is due to the different travel times between the active neutrinos which are confined to the brane and the sterile neutrinos which take shortcuts through the extra dimension.

Related papers:

23. Effect of Dark Matter Halos on Reionization

Natarajan, Aravind

Universität Bielefeld, Fak. für Physik, Universitätsstraße 25, D-33615 Bielefeld

If most of the dark matter in the Universe is composed of WIMPs, their annihilation will release energy, ionizing some of the gas in the Universe. We investigate the effect of the earliest dark matter halos on reionization. It is shown that these halos could contribute significantly to the WMAP inferred optical depth. Our results may be combined with studies of other ionizing sources to put stronger constraints on the allowed halo and particle parameters.

Related papers: arXiv:0805.3945v1 [astro-ph]

24. Supersymmetric Dark Matter, Catalyzed BBN, and Heavy Moduli Decay in mSUGRA with Gravitino LSP and stau NLSP

Panotopoulos, Grigoris

Arnold Sommerfeld Center for Theoretical Physics, Ludwig-Maximilians-University Munich, Theresienstr. 37, D-80333 Munich

In mSUGRA model we assume that gravitino, the LSP, plays the role of cold dark matter in the universe, while the lightest stau, the NLSP, catalyzes primordial BBN reconciling the discrepancy between theory and observations. We have taken into account all gravitino production mechanisms, namely decay from heavy scalar fields, decay from the NLSP, and from the thermal bath. We find that the dark matter constraint is incompatible with the lower bound on the reheating temperature

Related papers:

25. Neutralino Dark Matter and Collider Signals with and without Universality

Park, Eun-Kyung

Bonn university, Nussallee 12, D-53115 Bonn

We present brief synopses of supersymmetric models where either the neutralino composition or its mass is adjusted so that thermal relic neutralinos saturate the measured abundance of cold dark matter in the universe. We first review minimal supergravity (mSUGRA), and then examine its various one-parameter extensions where we relax the assumed universality of the soft supersymmetry breaking parameters. Our goal is to correlate relic-density-allowed parameter choices with expected phenomena in direct, indirect and collider dark matter search experiments.

Related papers: arXiv:0802.3384 [hep-ph], published in JHEP 0805:058,2008

26. SUSY Dark Matter with a Long-lived stau NLSP

Pradler, Josef

Max-Planck-Institut, Föhringer Ring 6, D-80805 München

In supersymmetric models with a long-lived stau being the lightest Standard Model superpartner, the primordial stau abundance is tightly constrained, e.g., from the catalytic production of Beryllium during BBN. We discuss the decoupling of the lighter stau from the primordial plasma and identify processes which are capable of depleting the resulting stau abundance significantly. We find particularly efficient stau annihilation at the resonance of the heavy CP-even Higgs boson and for a lighter stau with a sizeable left-right mixing due to enhanced stau-Higgs couplings. Even within the constrained MSSM, we encounter both effects leading to exceptionally small values of the resulting stau abundance.

Related papers: arXiv:0808.2462

27. Massive Hidden Photons as Lukewarm Dark Matter?

Redondo, Javier

DESY, Theory Group, Notkestrasse 85, D-22603 Hamburg

Extensions of the standard model, notably those based on string theory, often contain additional gauge U(1) symmetries in a hidden sector. The corresponding gauge bosons are often thought to be extremely heavy and to play no role in the history of the universe. However, if they are light, even a tiny kinetic mixing with the ordinary photon (tipcally $10^{-}11$) might be responsible for a sizable cosmological production that can account for the observed dark matter abundance. Such small kinetic mixing would also allow hidden photons to decay into 3 photons at cosmological time scales, opening the possibility of detection. We discuss this scenario, the computation of the relic abundance, and the strong astrophysical bounds and disfavor the most promising part of parameter space.

Related papers:

28. Light DM and various bounds on its properties.

Ruchayskiy, Oleg and Boyarsky, Alexey

EPFL, France

In this talk we review DM candidates with masses in keV-MeV range, and non-thermal primordial spectra (sterile neutrinos, gravitino, etc.). We discuss production mechanisms of these particles and various restrictions on their parameters: from searches for the decay lines, from analysis of Lyman-alpha forest, and from the phase-space density considerations.

Related papers:

29. Calibration of the XENON100 Detector

Santorelli, Roberto

Zürich Univ., Physik-Institut, Wintherthurerstr. 190, CH-8057 Zürich

The XENON Dark Matter Project aims to directly detect WIMPs (Weakly Interacting Massive Particles) with a dual phase Xenon TPC (Time Projection Chamber). After XENON10, the next step for the collaboration is the new XENON100 detector with 150kg of Xenon, currently installed underground at LNGS (Italy). Based on a similar dual-phase design as XENON10, XENON100 provides an increase in fiducial target mass of a factor 10 with an overall background rate of a factor 100 less. The 65 kg XeTPC is instrumented with 178 PMTs and it is surrounded by an 85 kg LXe active veto with an additional 64 PMTs. First test measurements have already begun, and the WIMP search data taking will start in the fall 2008. In this talk the many new developments of this detector will be introduced, as well as the latest results from calibration studies.

Related papers:

30. Small Extra Dimensions and Enhanced Symmetries in Orbifold Compactifications

Schmidt-Hoberg, Kai

Technische Univ. München

Higher-dimensional theories provide a promising framework for unified extensions of the supersymmetric standard model. Compactifications to four dimensions often lead to U(1) symmetries beyond the standard model gauge group, whose breaking scale is classically undetermined. Without supersymmetry breaking, this is also the case for the size and shape of the compact dimensions. Fayet-Iliopoulos terms generically fix the scale M of gauge symmetry breaking. The interplay with supersymmetry breaking can then stabilize the compact dimensions at a size $1/M$, much smaller than the inverse supersymmetry breaking scale. Simultaneously the shape moduli can be stabilized at symmetry enhanced points.

Related papers: arXiv:0803.4501

31. Superparticle Mass Window from Thermal Leptogenesis and Decaying Gravitino Dark Matter

Shindou, Tetsuo

DESY, Theory Group, Notkestrasse 85, D-22603 Hamburg

The thermal leptogenesis is explored in gravitino dark matter scenarios. High reheating temperature is achieved by introducing R-parity violations. Low-energy observables put an upper limit on the reheating temperature. Assuming the universal gaugino mass at the grand-unified scale, we found that the reheating temperature can reach $O(10^9)$GeV for a gravitino mass of $O(100)$GeV. We also showed that superparticles of the standard model are expected to be detected in the Large Hadron Collider.

Related papers:

32. Gravitino Dark Matter with broken a R-Parity

Staub, Florian

Julius-Maximilians-Unversität Würzburg, Institut für Theoretische Physik und Astrophysik, Am Hubland, D-97074 Würzburg

In Gauge Mediated SUSY Breaking (GMSB) scenarios the Gravitino is the lightest supersymmetric particle (LSP) and therefore a dark matter candidate, but for Gravitinos with masses in the keV range the relic density would be too high. This relic density could be reduced by the entropy production of the late time decays of messenger and SUSY particles.

Related papers:

33. Indirect Signatures of Gravitino Dark Matter

Tran, David

Physik Department, TU München, James-Franck-Str., D-85748 Garching

The gravitino is an interesting candidate for the cold dark matter of the Universe, especially in the context of thermal leptogenesis. However, in models where the gravitino is the lightest supersymmetric particle, the next-to-lightest sparticle is usually associated with cosmological problems stemming from Big Bang nucleosynthesis. These problems can be avoided by assuming a small violation of R-parity, which will also make the gravitino unstable. It remains a viable dark matter candidate, however, since the required smallness of the R-parity violation and the Planck scale suppression of gravitino interactions result in gravitino lifetimes that exceed the age of the Universe by many orders of magnitude. Interestingly, the late-time dark matter decays may produce observable signatures in cosmic rays. In fact, the decay of gravitino dark matter might account for anomalous excesses observed in both the extragalactic gamma-ray spectrum and in the positron fraction.

Related papers: arXiv:0709.4593 [astro-ph], arXiv:0804.4596 [astro-ph]

34. Viability of a Hidden U(1) Gaugino as Dark Matter

Weniger, Christoph

DESY, Theory Group, Notkestrasse 85, D-22603 Hamburg

We study the case, where the dark matter candidate is the gaugino of an unbroken hidden U(1), which interacts with the visible world only via a small kinetic mixing with hypercharge. Strong bounds on the phenomenologically satisfying parameter space can be derived from thermal production and BBN. We find that for the case of a slepton NLSP, the hidden gaugino-scenario is valid for mixing parameters of the order $\chi \sim \mathcal{O}(10^{-13} - 10^{-10})$. Furthermore, if the gravitino is the LSP and the hidden gaugino the NLSP, bounds on the reheating temperature from long lived staus can be relaxed.

Related papers:

35. The Primordial Abundance of stau NLSPs

Winkler, Martin

Technische Univ. München, Dept. für Physik, James-Franck Strasse, D 85747 Garching

In scenarios with a gravitino LSP, there exist strong BBN constraints on the abundance of a possible stau NLSP. We find that in settings with substantial left-right mixing of the stau mass eigenstates these constraints can be evaded even for very long-lived staus.

Related papers: arXiv:0808.0829 [hep-ph]

36. Dark Matter Signatures in the Anisotropic Radio Sky

Zhang, Le

II. Institut theoretische Physik, Univ. Hamburg, Luruper Chaussee 149, D-22761 Hamburg

We calculate intensity and angular power spectrum of the cosmological background of synchrotron emission from cold dark matter annihilation into electron positron pairs. We compare this background with intensity and anisotropy of astrophysical and cosmological radio backgrounds, such as from normal galaxies, radio-galaxies, galaxy cluster accretion shocks, the cosmic microwave background and with Galactic foregrounds. Under modest assumptions for the dark matter clustering we find that around 2 GHz average intensity and fluctuations of the radio background at sub-degree scales allows to probe dark matter masses > 100 GeV and annihilation cross sections not far from the natural values $\langle \sigma v \rangle \sim 3 \times 10^{-26}$ cm^3/s required to reproduce the correct relic density of thermal dark matter. The angular power spectrum of the signal from dark matter annihilation tends to be flatter than that from astrophysical radio backgrounds. Furthermore, radio source counts have comparable constraining power. Such signatures are interesting especially for future radio detectors such as SKA.

Related papers: arXiv:0807.3429