Selected Abstracts from Other Physical Review Journals

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Neutrino masses from large extra dimensions. Nima Arkani-Hamed, *SLAC, Stanford University, Stanford, California 94309;* Savas Dimopoulos, *Physics Department, Stanford University, Stanford, California 94305;* Gia Dvali, *Physics Department, New York University, New York, New York 10003, and ICTP, Trieste, Italy;* John March-Russell, *Theory Division, CERN, CH-1211, Geneva 23, Switzerland.* (Received 9 February 1999; published 26 December 2001)

Recently it was proposed that the standard model (SM) degrees of freedom reside on a $(3+1)$-dimensional wall or ''3-brane'' embedded in a higher-dimensional spacetime. Furthermore, in this picture it is possible for the fundamental Planck mass M_* to be as small as the weak scale $M_* \simeq O(\mathrm{TeV})$ and the observed weakness of gravity at long distances is due the existence of new submillimeter spatial dimensions. We show that in this picture it is natural to expect neutrino masses to occur in the 10^{-1}–10^{-4} eV range, despite the lack of any fundamental scale higher than M_*. Such suppressed neutrino masses are not the result of a seesaw, but have intrinsically higher-dimensional explanations. We explore two possibilities. The first mechanism identifies any massless bulk fermions as right-handed neutrinos. These give naturally small Dirac masses for the same reason that gravity is weak at long distances in this framework. The second mechanism takes advantage of the large *infrared* desert: the space in the extra dimensions. Here, small Majorana neutrino masses are generated by a breaking lepton number on distant branes. [Phys. Rev. D **65**, 024032 (2002)]

Neutrino interactions in oscillation experiments. E. A. Paschos and J. Y. Yu, *Institut für Physik, Universität Dortmund, D-44221 Dortmund, Germany.* (Received 17 July 2001; published 7 January 2002)

We calculate the neutrino induced cross sections relevant for oscillation experiments, including the τ-lepton threshold for quasielastic, resonance and deep-inelastic scattering. In addition to threshold effects, we include nuclear corrections for heavy targets which are moderate for quasielastic and large for single pion production. The nuclear effects for deep-inelastic reactions are small. We present cross sections together with their nuclear corrections for various channels which are useful for interpreting the experimental results and for determining parameters of the neutrino sector. Finally, we calculate the τ-lepton event rates for the OPERA LBL experiment. [Phys. Rev. D **65**, 033002 (2002)]

Are there ν_μ or ν_τ in the flux of solar neutrinos on Earth? C. Giunti, *INFN, Sezione di Torino and Dipartimento di Fisica Teorica, Università di Torino, Via P. Giuria 1, I–10125 Torino, Italy.* (Received 2 August 2001; published 10 January 2002)

Using the model independent method of Villante, Fiorentini, Lisi, Fogli, and Palazzo, and the rates measured in the SNO and Super-Kamiokande solar neutrino experiment, we calculate the amount of active ν_μ or ν_τ present in the flux of solar neutrinos on Earth. We show that the probability of $\nu_e \to \nu_{\mu,\tau}$ transitions is larger than zero at 99.89% C.L. We find that the averaged flux of $\nu_{\mu,\tau}$ on Earth is larger than 0.17 times the ^{8}B ν_e flux predicted by the BPB 2000 Standard Solar Model at 99% C.L. We discuss also the consequences of possible $\nu_e \to \overline{\nu}_{\mu,\tau}$ or $\nu_e \to \overline{\nu}_e$ transitions of solar neutrinos. We derive a model-independent lower limit of 0.52 at 99% C.L. for the ratio of the ^{8}B ν_e flux produced in the Sun and its value in the BPB 2000 Standard Solar Model. [Phys. Rev. D **65**, 033006 (2002)]

Comparison of the fits to data on polarized structure functions and spin asymmetries. Jan Bartelski, *Institute of Theoretical Physics, Warsaw University, Hoża 69, 00-681 Warsaw, Poland;* Stanisław Tatur, *Nicolaus Copernicus Astronomical Center, Polish Academy of Sciences, Bartycka 18, 00-716 Warsaw, Poland.* (Received 17 August 2001; published 7 January 2002)

In order to obtain polarized parton densities we make a next to leading order QCD fit using experimental data on the deep inelastic structure function g_1 measured on different nucleon targets. This fit is compared with the updated fit to the corresponding spin asymmetries. We get very similar results for all fits and also for different data samples. The integrated gluon contribution at $Q^2 = 1$ GeV^2 is, as in our previous fits, very small. It seems that only polarized parton densities for the nonstrange quarks Δu and Δd are relatively well determined from the present polarized deep inelastic experiments. [Phys. Rev. D **65**, 034002 (2002)]

Understanding $B \to D^{*-} N \overline{N}$ and its implications. Chun-Khiang Chua, Wei-Shu Hou, and Shang-Yuu Tsai, *Department of Physics, National Taiwan University, Taipei, Taiwan 10764, Republic of China.* (Received 14 July 2001; published 9 January 2002)

The CLEO Collaboration recently reported the observation of the $B^0 \to D^{*-} p\overline{n}$ mode at a rate of only a factor of 4–5 lower than $B^0 \to D^{*-}\rho^+$ and $D^{*-}\pi^+$. We try to understand this with a factorization approach of current produced nucleon pairs. The baryon weak vector current form factors are related by isospin rotation to nucleon electromagnetic form factors. By using $G_M^{p,n}$ measured from $e^+e^- \to \overline{N}N$ and $p\overline{p} \to e^+e^-$ processes, assuming factorization of the $B^0 \to D^{*-}$ transition and $p\overline{n}$ pair production, we are able to account for up to 60% of the observed rate. The remainder is argued to arise from the axial vector current. The model is then applied to

B decays to other mesons plus $p\bar{n}$ modes and D^{*-} plus strange baryon pairs. [Phys. Rev. D **65**, 034003 (2002)]

QCD factorized Drell-Yan cross section at large transverse momentum. Edmond L. Berger, *Division of High Energy Physics, Argonne National Laboratory, Argonne, Illinois 60439;* Jianwei Qiu and Xiaofei Zhang, *Department of Physics and Astronomy, Iowa State University, Ames, Iowa 50011.* (Received 30 July 2001; published 9 January 2002)

We derive a new factorization formula in perturbative quantum chromodynamics for the Drell-Yan massive lepton-pair cross section as a function of the transverse momentum Q_T of the pair. When Q_T is much larger than the pair's invariant mass Q, this factorization formula systematically resums the logarithmic contributions of the type $\alpha_s^m \ln^m(Q_T^2/Q^2)$ to all orders in the strong coupling α_s. When $Q_T \sim Q$, our formula yields the same Drell-Yan cross section as conventional fixed order QCD perturbation theory. We show that resummation is important when the collision energy $\sqrt{S}$ is large enough and $Q_T \gg Q$, and we argue that perturbative expansions are more stable and reliable in terms of the modified factorization formula. [Phys. Rev. D **65**, 034006 (2002)]

Azimuthal spin asymmetries of pion electroproduction. Bo-Qiang Ma, *Department of Physics, Peking University, Beijing 100871, China, and CCAST (World Laboratory), P.O. Box 8730, Beijing 100080, China;* Ivan Schmidt, *Departamento de Física, Universidad Técnica Federico Santa María, Casilla 110-V, Valparaíso, Chile;* Jian-Jun Yang, *Departamento de Física, Universidad Técnica Federico Santa María, Casilla 110-V, Valparaíso, Chile, and Department of Physics, Nanjing Normal University, Nanjing 210097, China.* (Received 10 September 2001; published 10 January 2002)

Azimuthal spin asymmetries, both for charged and neutral pion production in semi-inclusive deep inelastic scattering of unpolarized charged lepton beams on longitudinally and transversely polarized nucleon targets, are analyzed and calculated. Various assumptions and approximations in the quark distributions and fragmentation functions often used in these calculations are studied in detail. It is found that different approaches to the distribution and fragmentation functions may lead to quite different predictions on the azimuthal asymmetries measured in the HERMES experiments, thus their effects should be taken into account before using the available data as a measurement of quark transversity distributions. It is also found that the unfavored quark to pion fragmentation functions must be taken into account for π^- production from a proton target, although they can be neglected for π^+ and π^0 production. Pion production from a proton target is suitable to study the u quark transversity distribution, whereas a combination of pion production from both proton and neutron targets can measure the flavor structure of quark transversity distributions. [Phys. Rev. D **65**, 034010 (2002)]

Leading and higher twists in the proton polarized structure function g_1^p at large Bjorken x. S. Simula, *Istituto Nazionale di Fisica Nucleare, Sezione Roma III, Via della Vasca Navale 84, I-00146 Roma, Italy;* M. Osipenko, *Physics Department, Moscow State University, 119899 Moscow, Russia;* G. Ricco and M. Taiuti, *Dipartimento di Fisica, Universitá di Genova and INFN, Sezione di Genova, Via Dodecanneso 33, I-16146, Genova, Italy.* (Received 4 July 2001; published 10 January 2002)

A phenomenological parametrization of the proton polarized structure function $g_1^p(x,Q^2)$ is developed for $x \gtrsim 0.02$ using deep inelastic data up to ~ 50 $(\mathrm{GeV}/c)^2$ as well as available experimental results on both photo- and electroproduction of proton resonances. According to the new parametrization the generalized Drell-Hearn-Gerasimov sum rule is predicted to have a zero-crossing point at $Q^2 = 0.16 \pm 0.04$ $(\mathrm{GeV}/c)^2$. Then, low-order polarized Nachtmann moments are estimated and their Q^2 behavior is investigated in terms of leading and higher twists for $Q^2 \gtrsim 1$ $(\mathrm{GeV}/c)^2$. The leading twist is treated at NLO in the strong coupling constant and the effects of higher orders of the perturbative series are estimated using soft-gluon resummation techniques. In the case of the first moment, higher-twist effects are found to be quite small for $Q^2 \gtrsim 1$ $(\mathrm{GeV}/c)^2$, and the singlet axial charge has been determined to be $a_0[10\ (\mathrm{GeV}/c)^2] = 0.16 \pm 0.09$. In the case of higher order moments, which are sensitive to the large-x region, higher-twist effects are significantly reduced by the introduction of soft gluon contributions, but they are still relevant at $Q^2 \sim$ few $(\mathrm{GeV}/c)^2$ at variance with the case of the unpolarized transverse structure function of the proton. Our finding suggests that spin-dependent correlations among partons may have more impact than spin-independent ones. As a by-product, it is also shown that the Bloom-Gilman local duality is strongly violated in the region of polarized electroproduction of the $\Delta(1232)$ resonance. [Phys. Rev. D **65**, 034017 (2002)]

Signals of heavy Majorana neutrinos at hadron colliders. O. Panella,[1] M. Cannoni,[1,2] C. Carimalo,[3] and Y. N. Srivastava[1,2] [1]*Istituto Nazionale di Fisica Nucleare, Sezione di Perugia, Via A. Pascoli, I-06123 Perugia, Italy,* [2]*Dipartimento di Fisica, Universitàdegli Studi di Perugia, Via A. Pascoli, I-06123, Perugia, Italy,* [3]*Laboratoire de Physique Nucléaire et Hautes Energies, IN2P3-CNRS Université Pierre et Marie Curie, 4 place Jussieu, Tour 33, F-75252, Paris Cedex 05, France.* (Received 17 July 2001; published 9 January 2002)

The lepton number violating signal of like-sign dileptons (LSD), $pp \to l^{\pm} l^{\pm} + 2$ jets, is investigated within a model of mixing in the neutrino sector assuming the existence of heavy Majorana neutrino states with a left-handed coupling to the light leptons. Helicity amplitudes are given pointing out differences with calculations previously reported by other authors. The signal cross sections are computed at the energy of the LHC ($\sqrt{S} = 14$ TeV) at CERN and within the existing experimental limits on the mixing couplings, including those coming from neutrinoless double beta decay. [Phys. Rev. D **65**, 035005 (2002)]

Numerical portrait of a relativistic thin film BCS superfluid. Simon Hands, *Department of Physics, University of Wales Swansea, Singleton Park, Swansea SA2 8PP, United Kingdom;* Biagio Lucini, *Department of Theoretical Physics, 1 Keble Road, Oxford OX1 3NP, United Kingdom;* Susan Morrison, *Department of Physics, University of Wales Swansea, Singleton Park, Swansea*

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We present results of numerical simulations of the $(2+1)$D Nambu–Jona-Lasinio model with a nonzero baryon chemical potential μ, including the effects of a diquark source term. Diquark condensates, susceptibilities and masses are measured as functions of source strength j. The results suggest that diquark condensation does not take place in the high density phase $\mu > \mu_c$, but rather that the condensate scales nonanalytically with j, implying a line of critical points and long range phase coherence. Analogies are drawn with the low temperature phase of the 2D XY model. The spectrum of the spin-$\frac{1}{2}$ sector is also studied, yielding the quasiparticle dispersion relation. There is no evidence for a nonzero gap; rather the results are characteristic of a normal Fermi liquid with Fermi velocity less than that of light. We conjecture that the high density phase of the model describes a relativistic gapless thin film BCS superfluid. [Phys. Rev. D **65**, 036004 (2002)]

Comments on "Modification of *Z* boson properties in the quark-gluon plasma" and "Two-loop contribution to high mass dilepton production by a quark-gluon plasma". P. Aurenche,[1] R. Baier,[2] T. Becherrawy,[3] Y. Gabellini,[5] F. Gelis,[4] T. Grandou,[5] M. Le Bellac,[5] B. Pire,[6] D. Schiff,[7] and H. Zaraket[1] [1]*LAPTH, BP110, F-74941, Annecy le Vieux, Cedex, France,* [2]*Fakultät für Physik, Universität Bielefeld, D-33501 Bielefeld, Germany,* [3]*Faculté des Sciences, Université de Nancy-1, Boîte Postale 239, F-54506, France,* [4]*Brookhaven National Laboratory, Nuclear Theory, Building 510A, Upton, New York 11973,* [5]*INLN, 1361 Route des Lucioles, F-06560 Valbonne, France,* [6]*CPhT, Ecole Polytechnique, F-91128 Palaiseau, France,* [7]*LPT, Université Paris-Sud, Bâtiment 210, F-91405 Orsay, France.* (Received 1 September 2000; published 10 January 2002)

We examine recently published results on the thermal production of massive vector bosons in a quark-gluon plasma. We claim the production rate of a massive boson is a collinear safe observable. [Phys. Rev. D **65**, 038501 (2002)]

Reply to "Comment on 'Modification of *Z* boson properties in the quark-gluon plasma' and 'Two-loop contribution to high mass dilepton production by a quark-gluon plasma' ". J. I. Kapusta, *School of Physics and Astronomy, University of Minnesota, Minneapolis, Minnesota 55455;* S. M. H. Wong, *Department of Physics, Ohio State University, Columbus, Ohio 43210.* (Received 8 June 2001; published 10 January 2002)

We identify the main difference between our work and earlier work on the imaginary part of two-loop massive vector self-energies at finite temperature. [Phys. Rev. D **65**, 038502 (2002)]

Weak magnetism for antineutrinos in supernovae. C. J. Horowitz, *Nuclear Theory Center and Department of Physics, Indiana University, Bloomington, Indiana 47405.* (Received 14 September 2001; published 11 January 2002)

Weak magnetism increases antineutrino mean free paths in core collapse supernovae. The parity violating interference between axial vector and vector currents makes antineutrino-nucleon cross sections smaller than those for neutrinos. We calculate simple, exact correction factors to include recoil and weak magnetism in supernova simulations. Weak magnetism may significantly increase the neutrino energy flux. We calculate, in a diffusion approximation, an increase of order 15% in the total energy flux for temperatures near 10 MeV. This should raise the neutrino luminosity. Weak magnetism also changes the emitted spectrum of $\overline{\nu_x}$ (with $x=\mu$ or τ) and $\overline{\nu_e}$. We estimate that $\overline{\nu_x}$ will be emitted about 7% hotter than ν_x because $\overline{\nu_x}$ have longer mean free paths. Likewise weak magnetism may increase the $\overline{\nu_e}$ temperature by of order 10%. This increase in temperature coupled with the increase in neutrino luminosity should increase the heating in the low density region outside of the neutrino sphere. This, in turn, could be important for the success of an explosion. It is important to check our results with a full simulation that includes Boltzmann neutrino transport and weak magnetism corrections. [Phys. Rev. D **65**, 043001 (2002)]

Update on neutrino mixing in the early universe. P. Di Bari, *Deutsches Elektronen-Synchrotron DESY, 22603 Hamburg, Germany.* (Received 23 August 2001; published 22 January 2002)

From the current cosmological observations of cosmic microwave background (CMB) and nuclear abundances, we show, using an analytic procedure, that the total effective number of extra neutrino species $\Delta N_\nu^{\rm tot} < 0.3$. We also describe the possible signatures of nonstandard effects that could be revealed in future CMB observations. This cosmological information is then applied to neutrino mixing models. Taking into account the recent results from the Sudbury Neutrino Observatory (SNO) and SuperKamiokande experiments, disfavoring pure active to sterile neutrino oscillations, we show that all four neutrino mixing models, both of $2+2$ and $3+1$ type, lead to a full thermalization of the sterile neutrino flavor. Moreover such a sterile neutrino production excludes the possibility of an electron neutrino asymmetry generation and we conclude that $\Delta N_\nu^{\rm tot} \simeq 1$, in disagreement with the cosmological bound. This result is valid under the assumption that the initial neutrino asymmetries are small. We suggest the existence of a second sterile neutrino flavor, with mixing properties that generate a large electron neutrino asymmetry, as a possible way out. [Phys. Rev. D **65**, 043509 (2002)]

Active-sterile neutrino oscillations in the early Universe: Asymmetry generation at low $|\delta m^2|$ and the Landau-Zener approximation. P. Di Bari, *Istituto Nazionale di Fisica Nucleare (INFN), Italy, and School of Physics, Research Centre for High Energy Physics, The University of Melbourne, Victoria 3010, Australia;* R. Foot, *School of Physics, Research Centre for High Energy Physics, The University of Melbourne, Victoria 3010, Australia.* (Received 20 March 2001; published 15 January 2002)

It is well established that active-sterile neutrino oscillations generate large neutrino asymmetries for very small mixing angles ($\sin^2 2\theta_0 \lesssim 10^{-4}$), negative values of δm^2, provided that $|\delta m^2| \gtrsim 10^{-4}$ eV^2. By numerically solving the quantum kinetic equa-

tions, we show that the generation still occurs at much lower values of $|\delta m^2|$. We also describe the borders of the generation at small mixing angles and show how our numerical results can be analytically understood within the framework of the Landau-Zener approximation thereby extending previous work based on the adiabatic limit. This approximate approach leads to a fair description of the MSW dominated regime of the neutrino asymmetry evolution and is also able to correctly reproduce its final value. We also briefly discuss the impact that neutrino asymmetry generation could have on big bang nucleosynthesis, CMBR and relic neutrinos. [Phys. Rev. D **65**, 045003 (2002)]

Combining LSND and atmospheric anomalies in a three-neutrino picture. Gabriela Barenboim, *CERN-TH Division, CH-1211 Geneva 23, Switzerland, and FERMILAB Theory Group, MS 106, P.O. Box 500, Batavia, Illinois 60510;* Amol Dighe, *CERN-TH Division, CH-1211 Geneva 23, Switzerland, and Max-Planck-Institut für Physik, Föhringer Ring 6, D-80805 Munich, Germany;* Solveig Skadhauge, *Department of Mathematical Physics, LTH, Lund University, S-22100 Lund, Sweden.* (Received 27 June 2001; published 15 January 2002)

We investigate the three-neutrino mixing scheme for solving the atmospheric and LSND anomalies. We find the region in the parameter space that provides a good fit to the LSND and the SK atmospheric data, taking into account the CHOOZ constraint. We demonstrate that the goodness of this fit is comparable to that of the conventional fit to the solar and atmospheric data. Large values of the LSND angle are favored and $\sin^2(2\theta_{\mathrm{LSND}})$ can be as high as 0.1. This can have important effects on the atmospheric electron neutrino ratios as well as on down-going multi-GeV muon neutrino ratios. We examine the possibility of distinguishing this scheme from the conventional one at the long baseline experiments. We find that the number of electron neutrino events observed at the CERN to Gran Sasso experiment may lead us to identify the scheme, and hence the mass pattern of neutrinos. [Phys. Rev. D **65**, 053001 (2002)]

Neutrino opacity in magnetized hot and dense nuclear matter. Deepak Chandra, *Department of Physics & Astrophysics, University of Delhi, Delhi 110 007, India, Inter University Centre for Astronomy & Astrophysics, Ganeshkhind, Pune-411007, India, and Department of Physics, S.G.T.B. Khalsa College, University of Delhi, Delhi 110 007, India;* Ashok Goyal, *Department of Physics & Astrophysics, University of Delhi, Delhi 110 007, India, and Inter University Centre for Astronomy & Astrophysics, Ganeshkhind, Pune-411007, India;* Kanupriya Goswami, *Department of Physics & Astrophysics, University of Delhi, Delhi 110 007, India, and Department of Physics, Keshav Mahavidyalaya, Keshavpuram, Delhi 110 035, India.* (Received 10 September 2001; published 24 January 2002)

We study the neutrino interaction rates in hot matter at high densities in the presence of a uniform magnetic field. The neutrino cross sections involving both the charged current absorption and neutral current scattering reactions on baryons and leptons have been considered. We have in particular considered the interesting case when the magnetic field is strong enough to completely polarize the protons and electrons in supernovae and neutron stars. The opacity in such a situation is considerably modified and the cross section develops anisotropy. This has implications for phenomena invoked in the literature to explain the observed pulsar kicks. [Phys. Rev. D **65**, 053003 (2002)]

Anatomy of the differential gluon structure function of the proton from the experimental data on $F_{2p}(x,Q^2)$. I. P. Ivanov, *IKP (Theorie), Forschungszentrum Jülich, Germany, Institute of Mathematics, Novosibirsk, Russia, and Novosibirsk State University, Novosibirsk, Russia;* N. N. Nikolaev, *IKP (Theorie), Forschungszentrum Jülich, Germany, and L. D. Landau Institute for Theoretical Physics, Moscow, Russia.* (Received 5 July 2001; published 22 January 2002)

The differential gluon structure function of the proton $\mathcal{F}(x,Q^2)$ introduced by Fadin, Kuraev, and Lipatov in 1975 is used in many applications of small-x QCD. We report here ready-to-use parametrizations of $\mathcal{F}(x,Q^2)$ from the κ-factorization phenomenology of the experimental data on the small-x proton structure function $F_{2p}(x,Q^2)$. These parametrizations are based partly on the available Dokshitzer-Gribov-Lipatov-Altarelli-Parisi (DGLAP) evolution fits [Glück-Reya-Vogt, Coordinated Theoretical/Experimental Project on QCD Phenomenology (CTEQ), and Martin-Roberts-Stirling] to parton distribution functions and on realistic extrapolations into a soft region. We discuss the impact of soft gluons on various observables. The x dependence of the $\mathcal{F}(x,Q^2)$ so determined varies strongly with Q^2 and does not exhibit simple Regge properties. Nonetheless, the hard-to-soft diffusion is found to give rise to a viable approximation of the proton structure function $F_{2p}(x,Q^2)$ by the soft and hard Regge components with intercepts $\Delta_{\mathrm{soft}}=0$ and $\Delta_{\mathrm{hard}}\sim 0.4$. [Phys. Rev. D **65**, 054004 (2002)]

How the quark self-energy affects the color-superconducting gap. Qun Wang, *Institut für Theoretische Physik, J. W. Goethe-Universität, D-60054 Frankfurt am Main, Germany, and Physics Department, Shandong University, Jinan, Shandong 250100, People's Republic of China;* Dirk H. Rischke, *Institut für Theoretische Physik, J. W. Goethe-Universität, D-60054 Frankfurt am Main, Germany.* (Received 5 October 2001; published 22 January 2002)

We consider color superconductivity with two flavors of massless quarks which form Cooper pairs with total spin zero. We solve the gap equation for the color-superconducting gap parameter to subleading order in the QCD coupling constant g at zero temperature. At this order in g, there is also a previously neglected contribution from the real part of the quark self-energy to the gap equation. Including this contribution leads to a reduction of the color-superconducting gap parameter ϕ_0 by a factor $b_0'=\exp[-(\pi^2+4)/8]\simeq 0.177$. On the other hand, the BCS relation $T_c\simeq 0.57\phi_0$

between ϕ_0 and the transition temperature T_c is shown to remain valid after taking into account corrections from the quark self-energy. The resulting value for T_c confirms a result obtained previously with a different method. [Phys. Rev. D **65**, 054005 (2002)]

Macroscopic effects in cold magnetized nucleons and electrons with anomalous magnetic moments. V. R. Khalilov, *Department of Physics, Moscow State University, Moscow 119899, Russia.* (Received 25 June 2001; published 22 January 2002)

A model of a degenerate neutron gas in chemical equilibrium with a background of degenerate electrons and protons in a constant uniform ultrastrong magnetic field is applied to describe the state of matter in the cores of strongly magnetized neutron stars. Expressions for the thermodynamic quantities are obtained including the anomalous magnetic moments of the fermions. It is shown that (1) the inclusion of the anomalous magnetic moments of charged fermions leads to nonperiodic magnetic oscillations of their thermodynamic quantities in strong magnetic fields, (2) the total stress energy tensor relevant for neutron star structure must include contributions from both the magnetized matter and the magnetic field and as a result the total pressure produced is anisotropic, and (3) complete spin polarization of neutrons occurring in superstrong magnetic fields must lead to an increase in the degeneracy pressure compared with the zero field case at the same neutron densities. It is hoped that the results obtained will have applications for the structure in neutron stars with ultrastrong frozen-in magnetic fields. [Phys. Rev. D **65**, 056001 (2002)]

Strangeness suppression in proton-proton collisions. Hans-Joachim Drescher, *New York University, 4 Washington Place, New York, New York 10003;* Jörg Aichelin and Klaus Werner, *SUBATECH, La Chantrerie 4, rue Alfred Kastler, BP 20722-44307, Nantes-cedex 3, France.* (Received 3 May 2001; published 22 January 2002)

Can the yield of a strange particle serve as the smoking gun for the creation of a quark-gluon plasma? In order to answer this question one has first to understand strange particle production in elementary *pp* reactions. Here one observes a big difference between BNL RHIC and CERN SPS energies. The mass yield distribution is much steeper at SPS than at RHIC. Surprisingly the form of the mass yield for (e^+e^-) annihilation, which is almost energy independent, agrees perfectly with *pp* reactions at RHIC. After having verified that the recently advanced NEXUS approach reproduces well the existing data, we interpret the results: strangeness is suppressed in proton-proton collisions at SPS energy as compared to electron-positron (e^+e^-) annihilation due to the limited masses of the strings produced in the reaction. [Phys. Rev. D **65**, 057501 (2002)]