Session PS1 : QCD and Confinement

1- Damir Becirevic, Universita La Sapienza and INFN (Sezione di Roma), Italy.

Title: Lattice QCD Phenomenology.

Abstract: 1- Lattice QCD estimates of the quark masses 2- New estimates for K-Kbar and B-Bbar mixing amplitudes (new results) 3- Various $\Delta B = 0$ and $\Delta B = 2$ four fermion operators and their repercussions on the phenomenology (new results) 4-Review present status of $K \to \pi\pi$ decays and prospects for the future 5- New results for $B \to K\ell^+\ell^-$ and $B \to \pi\ell\nu$.

2- Igor Dremin, Lebedev Physical Institute, Moscow, Russia.

Title: Multiplicity distributions of quark and gluon jets in QCD (I.M. Dremin and J. Tran Thanh Van (Orsay)).

Abstract: The average multiplicities and moments of the distributions of quark and gluon jets are calculated up to NLO approximation of the perturbative QCD. The results are compared to experimental data.

3- Fabrizio Fabbri, INFN and University of Bologna, Italy.

Title: Testing QCD at the highest LEP energies.

Abstract: Results from the study of global features of multihadronic events (event shapes distributions, jet rates, multiplicities and charged particle spectra) and measurements of α_s at the highest available e+e- collisions at LEP, are reviewed. The overall consistency of QCD is tested at yet higher energies and with improved statistical precision due to the dramatic increase in integrated luminosity at c.m. energies above 161 GeV. The large data samples collected at the highest energies, together with the fact that hadronization corrections become less important at higher c.m. energies allows the measurement of the strong coupling constant to be performed with a precision comparable with that achieved at the Z0 peak energy.

4- Le Trong-Tuong, Faculty of Physics Pedagogical University of Hanoi, Hanoi, Vietnam.

Title: The Skyrmions from kinks, the modified symmetry breaking term of Skyrme model and the time evolution of the soliton solution (Nguyen Vien Tho, Hue University, Le Trong Tuong, Hanoi University and Phu Chi Hoa, Dalat University).

Abstract: We consider some phenomenological implications of the identification of the Skyrmion profile solution with a sin-Gordon field. With this identification, we obtain explicit expressions for the

proton and neutron charge distributions, the shape of nucleon electric form factors. It is found that the agreement with the experimental measures may be observed in the large q^2 region. The chiral symmetry breaking term of the Skyrme model is modified to obtain the hedgehog profile function which is in best coincidence with the kink-like profile function. For the modified Lagrangian, the minimum of the energy of the B-2 twisty skyrmion configuration is lower than the values for both the cases of the Skyrme lagrangian with and without the non-modified symmetry-breaking term. The equation of motion for the time-dependent hedgehog for this model is derived and integrated numerically.

5- Ma Wei-Xing, Institute of High Energy Physics, Beijing, China.

Title : The Pomeron and QCD.

Abstract: We examine the possibility that the $\xi(2230)$ meson is a member of the Pomeron trajectory. A method connecting the $\xi(2230) \to p\bar{p}$ decay width and the pp cross section through the Pomeron residue function is presented. We have used a relativistic, singularity-free form factor to make the analytic continuation of the residue function between crossed channels. We predict that if the $\xi(2230)$ meson is a Pomeron, then it should have a $\xi \to p\bar{p}$ decay width of about 2 MeV.

6- Christopher Maxwell, University of Durham, Durham, England.

Title: Complete Renormalization Group Improvement- Avoiding Factorization and Renormalization Scale Dependence in QCD predictions.

Abstract: We show that all dependence on renormalization and factorization scales disappears provided that they are held independent of the physical energy scale Q on which the observable depends, and the ultraviolet logarithms that build the Q-dependence are identified and resummed to all-orders. For next-to-leading order calculations this is equivalent to Grunberg's Effective Charge Approach. A simple and direct method of extracting QCD Λ from experimental data is advocated, in which the renormalization scale need not be mentioned. It is applied to LEP data for e+e- jet observables at various energies.

7- Vladislav Simak, Institut of Physics ASCR, Praha, Czeckoslovakia.

Title: QCD jets in Dzero experiment, recent results.

Abstract: Summary of recent results on jet physics in antiproton-proton interactions at 1800 and 630 GeV centre-of-mass energies. Comparison of inclusive cross- sections at 1800 and 630 GeV with theoretical predictions. Triple jets correlations are compared with various structure functions. Two

jets mass distributions and limits on quark compositteness.

8- Jerzy Szwed, Jagellonian University, Krakow, Poland.

Title: The QCD structure of the electron.

Abstract: Advantages of introducing the electron structure function (ESF) are presented. As compared to the photon structure function (PhSF), it can be obtained from experiment (in electron induced reactions) in more precise and direct way. Also from the theoretical point of view, the ESF gives more adequate description than the PhSF. In particular at very high energies when other gauge bosons enter into play, the PhSF looses its sence due to large γ-Z intergerence, whereas the ESF preserves its probabilistic (partonic) interpretation. The momentum scales entering the process are better controlled. At present energies, the extraction (from the same experiment) of both the PhSF and ESF gives an important cross-check of the two analyses. Theoretical predictions on the ESF at present and future energies will be shown. First expreimental data on the ESF measured at LEP will also be presented.

9- Bob Tapper, Bristol University, Bristol, England.

Title : Hadronic final sate in Deep Inelastic Scattering at HERA.

Abstract: Results on the analysis of the hadronic final state in neutral current deep inelastic scattering at HERA are presented; recent results on inclusive single particle distributions and particle correlations are highlighted.

10- Zhou Li-Juan, Guang Xi university, Guang Xi, China.

. Title: QCD description of Strange meson Photo-production.

Abstract: Based on the low energy QCD Lagrangian and using the wave functions of $SU_{SF}(6) \times O(3)]_{sym.} \times SU_C(3)$ quark model of baryon structure, the strange meson photo-production off the proton is studied. Calculations on cross section and Polarization for $\gamma + p \to K^+ + \Lambda$ reaction are performed and compared with experimental data. The theoretical predictions are in good agreement with data.

11- Bonnie T. Fleming, Columbia University, Nevis Laboratories, Irvington, NY, USA.

Title: Recent Structure Function Results from Neutrino Scattering at the Fermilab CCFR Experiment.

Abstract: We report on the extraction of the structure functions F2, $\Delta(xF3)$ = xF3(nu)-xF3(nubar), and R(longitudinal) from CCFR neutrino-nucleon differential cross sections. The extraction is performed in a physics model independent (PMI) way for the first time. The F2 (PMI) values measured in the CCFR neutrino experiment are in good agreement with the F2 (NMC) measured in muon scattering above $Q^2 = 1\text{GeV}^2$, thus resolving the long-standing discrepancy between the two sets of data. Comparison of the two sets of data below $Q^2 = 1\text{GeV}^2$, which provides information on the axial vector contribution is also presented. The CCFR values for $(R = \sigma_L/\sigma_T)$ are in good agreement with muon and electron data for $x \geq 0.1$. For $x \leq 0.1$, R for neutrinos is somewhat larger than R from muon and electron scattering, as expected from the difference in charm production contributions. We also report on an investigation of R in neutrino scattering for possible anomalous large nuclear effects (at low x and $Q^2 \leq 1$ GeV^2) of the type recently reported by the HERMES collaboration in electron scattering.

12- Stefan Tapprogge, Cern, Geneva, Switzerland.

Title: QCD at the LHC with ATLAS.

Abstract: The LHC will allow QCD studies to be performed at very high energy, including precision tests and measurements in an as yet unexplored kinematic region. A detailed understanding of QCD is important for almost all physics processes to be studied at the LHC, as the production mechanisms are mostly controlled by QCD. This talk will review various measurements of QCD-related processes to be performed at the LHC, based on final states containing leptons, photons and jets. The kinematic reach and the expected statistical uncertainties will be discussed for selected examples, followed by a presentation of sources of systematic uncertainties and contributions from background processes.