

High Energy Physics

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 - perturbative QCD :
 - * Scheme independence
 - * Charmonium production
 - * Hard Probes for QGP (Jets, Drell-Yan, ..)

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- Electroweak Precision parameters
- Chiral Phase Transition, Debye Screening
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- Some examples from here:
 - τ -polarisation in Charged Higgs search
 - J/ψ -suppression : normal vs. anomalous
 - Angular Distributions in $B \rightarrow VV$ decays
 - HERA large Q^2 -events

- Current and Future Experimental Facilities :

- RHIC at BNL, Tevatron, B-Factories, LHC at CERN, ILC...
- J-PARC at Tokai, Japan, FAIR at GSI, Germany
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- **Retired – D. P. Roy (July 2006) ; To Join – Saumen Datta (Oct. 2006)**

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- Physics Beyond Standard Model (Sridhar, Probir)
 - Higgs at LHC and ILC: Signals for SM vs. MSSM, Invisible Higgs
 - SUSY Phenomenology at LHC and ILC: Sparticle properties, Dark Matter

- Extra Dimension Phenomenology and Braneworld models (ADD, RS)
- Signals to distinguish SUSY from LED
- Signals for AMSB at ILC

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 - At Finite T & μ – Fermion Sign Problem and QCD Phase Diagram.
 - Weak Matrix Elements & Decay Constants, Hadron spectra, Form factors.
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 - LHC Physics – Jets, Higher orders and resummations, QCD corrections for BSM processes...

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 - Formation, Thermalization and Expansion – Transport Theory, Rel. Hydrodynamics (ideal or dissipative).
 - QGP Signals – Elliptic Flow, Jet Quenching, Fluctuations, Strangeness, Quarkonium Suppression.
 - Equation of State at Large Baryon Density (Lattice, Models, Nuclear Matter..).
 - Simple Models as bridge between Lattice and Experimental Data– Quasiparticle models, Hadron Resonance Gas, Quarkonia from Lattice $Q\bar{Q}$ potential, sQGP and coloured states...