HIGGS AND RELATED TOPICS

1. Does finding the 125 GeV Higgs boson exclude all other possible mass creation mechanisms?
2. Is this the SM Higgs boson? How much space is left for extensions (like the SUSY Higgs sector)?
3. How special is the 125 GeV mass in view of the top mass? (What happens to the future of particle physics if the EW vacuum is stable?)
4. How does the 125 GeV Higgs boson orient the plans for the next colliders, ILC and/or FCC?
5. Is there any role of the Higgs boson in the evolution of the universe?

DIFFRACTION

1.Which problems of principle underlie the diffractive studies?
2.What is the Pomeron?
3.What is the “true asymptotic regime” (“Asymptopia”), if any?
4.How to account for coherent and incoherent states of partons in proton wave functions?
5.If QCD has anything concrete to say about diffractive scattering?

HEAVY QUARKS AND HADRON SPECTROSCOPY

1. Is heavy quark flavor physics really needed in the LHC era? If LHC discovers new physics, how will flavor physics help to interpret it? What if LHC finds nothing new?
2. There is a flow of experimental results on XYZ states and their interpretations. Is there a convergence or a consensus on any of these ?
3. Most of experiments deal with s-channel formation of baryons. Are other mechanisms like t-channel useful as a complementary source ?
4. Is there a feasible unification of data presentation from various experiments for mesons similar to what is done for baryon spectroscopy?
5. Where are glueballs?

NEUTRINOS

1. Can sidereal time analysis of the long time neutrino observations give information about the galaxy distribution in the Local Universe?
2. How well do we need to know the PMNS matrix elements?
3. Is the existence of MSW effect proved experimentally ?
4. Are there new species of neutrino (e.g. the «sterile» one)?
5. What are other most important problems in neutrino physics (CP-violation)?
6. Can sidereal time analysis of the long time neutrino observations give information about the galaxy distribution in the Local Universe?
7. Perspectives of existing and future neutrino experiments (LNBF, LAGUNA, ICARUS, SHIP ...)

HEAVY IONS

1. Which experimental data (dis)prove deconfiment of the QCD matter created in heavy ion collisions?
2. Which grounds are there for thermodynamics application to describe the QCD matter produced at RHIC and LHC energies?
3. Which experimental data confirm existence or absence of phase transition in heavy ion collisions?
4. Which new properties of quark-gluon matter are observed at LHC compared with those at RHIC and which are plans for the future?
5. Is there any evolution in our understanding of the QCD matter from RHIC to LHC energies?

HIGH-ENERGY COSMIC RAYS

1. What is the origin of the GZK-like suppression of the cosmic ray (CR) flux? Is it due to energy loss during propagation or due to reaching maximum energy achievable in a source?
2. Are the data on mass composition of ultra- high energy CRs consistent with a hypothesis that primary particles are 100% proton? Or an admixture of heavy nuclei is also allowed?
3. Does the deficit of muons in LHC-tuned MC simulations mean that current hadronic interaction models must be seriously corrected?
4. Does the anomalous positron fraction (PF) approach a stable asymptotic value or a sharp cutoff at higher energies is possible?
5. Do we observe annihilation of a dark matter or nearby pulsar contribution? Will anisotropy in an arrival direction of CR leptons rule out a dark matter interpretation of PF?
6. Is low-mass WIMP region completely excluded by the data?

ASTROPHYSICS AND COSMOLOGY

1. Is there a conflict of BICEP2 data with the PLANCK measurements on the relic gravitational waves generated during the Universe inflation?
2. Do sterile neutrinos with the mass about 0.5 eV really relax PLANCK constraints on both the amplitude of tensor modes of inhomogeneity and Hubble rate?
3. Why the dark matter particles are still not detected in conflict with direct expectations of cosmological models?
4. The baryogenesis is dead, the leptogenesis is prospective, isn't it?
5. Are there crucial astrophysical observational tests which can distinct between alternative cosmological models?
6. Is it possible that observations of the large scale spatial galaxy distribution will change the SCM paradigm?
7. How does Feynman's field gravity approach change predictions for observational effects in relativistic astrophysics?