


#EPSHEP2017  
#PhysicsInVenice

Saturday 08 July 2017

## Yesterday in short

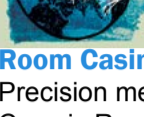
Firstly, the beautiful evidence of  $H \rightarrow b\bar{b}$  at LHC, presented by ATLAS during the Thursday Higgs session, have to be added to this summary. Yesterday, the latest results on sterile neutrino searches were reported. The present status and future prospects to test their Majorana nature through  $0\nu\beta\beta$  are getting excitingly close to the expected rate for an inverted neutrino mass hierarchy. The LHC experiments presented results on correlations in pp, pA and AA collisions: indications of collectivity in high-multiplicity pp spark the discussion on the formation of a QGP. Other hints of this are seen in the ALICE strangeness results. GW physics data, studied from different perspectives to extract all possible info about astrophysics, cosmology and gravity, were also discussed. Indirect DM searches, like those based on gamma-ray and cosmic-ray, could detect WIMPS when they decay into SM particles. Strengths and limitations of such studies have been highlighted. Several challenging experimental efforts are undergoing worldwide to search axions and axion-like particles. The theory status in the charm sector have been summarized. Recent measurements on charm and beauty quark physics, namely in the CP violation sector, radiative decays and mixing, future perspectives in the charm sector from the BelleII collaboration and LHCb measurements of CP violation in b baryons have been presented. Upgrades of the calorimeters of CMS and ATLAS at the LHC, and of the LHCb RICH have been reported. Results from CaloCube prototype for satellite borne calorimetry. Characterization of SiPM for CTA prototypes. R&D progress on ultra fast Si detectors and on diamond pixel detectors. Progress on luminosity calorimeter prototype. A complete review of the existing multi-boson results has been shown, including the first light-by-light scattering evidence in lead-lead collisions. Full blown program of top physics measurements at Tevatron and LHC. A new theory calculation for fully differential t-antitop production and decay at the NNLO has been shown, which brings improvement with the measurements of the fiducial cross section and distributions from ATLAS and CMS, demonstrating that the advancing precision of the LHC experiment pushes advancement in theory.

## Today's highlights




### ACCELERATORS FOR HEP

**Room Martinelli**  
Accelerator designs and R&D for the Electron-Ion Collider, e+e- Factories. Machine detector interface for the e+e- FCC. Gamma factory proposal.




### ASTROPARTICLE PHYSICS

**Room Casinò**  
Precision measurement of positron fraction in Primary Cosmic Rays in space. Upgrade of Earth Observatories and of undersea and underground experiments.



### DETECTOR R&D AND DATA HANDLING

**Room Amici**  
Upgrades of tracking detectors of LHC experiments. Status and upgrade of large scale apparatus for different experimental purposes.



### FLAVOUR PHYSICS AND FUNDAMENTAL SYMMETRIES

**Room Mosaici-2**  
The experimental and theory status of the muon g-2 parameter. The physics of kaons and of the mu to e gamma transition will be summarized together with the future experimental and theoretical perspectives in this sectors.



### HIGGS AND NEW PHYSICS

**Room Perla**  
Composite Higgs. VH and HH resonances. Search for diboson resonances decaying into W,Z and H. Exotic signatures of new gauge bosons. Searches for VV/ V+gamma resonances. Search for vector-like quarks. Search for new physics in lepton+jet final states.



### NEUTRINO PHYSICS

**Room Casinò**  
Impact of heavy sterile neutrinos on the triple Higgs coupling. Matching and options in Neutrino EFT. Quasi-sterile neutrinos at long-baseline oscillation experiments. Effects of RGE on fermions. Leptogenesis via varying Weinberg operator. Neutrino electromagnetic properties.



### OUTREACH, EDUCATION AND DIVERSITY

**Room Mangano**  
Today's session will target best practice reports and the big topic of science communication in HEP. Again, the session will be concluded by a discussion panel on SciCom in HEP.



### QCD AND HADRONIC PHYSICS

**Room Mosaici-1**  
Recent QCD results at various experiments. New mechanisms in the production of two J/psi quarkonia in proton-proton scattering at the LHC. Charm and beauty production. High mass hadrons. Exotic multiquark states. Measurements on pentaquark and tetraquarks states. tetraquark tetraquark states.



### QUANTUM FIELD AND STRING THEORY

**Room Welles**  
Recent developments in Quantum Fields and Strings ranging from QCD to UV properties of effective field theories, from loop-tree duality to strongly coupled models and holography, from graviton radiation in high energy collisions to black holes, from exact results in supersymmetric theories to stringy Yukawa's



### TOP AND ELECTROWEAK PHYSICS

**Room Volpi**  
Potential offered by future machines to electroweak and top physics measurement. The larger energy, larger statistics (or both) will provide significant improvements both in precision and in the study of rare processes.

## Events

\*Today ECFA Special Session "Particle Physics and Society, extending our Vision and Reach" - Sala Grande, Palazzo del Cinema, h. 14.30.

\*The public event "Universo, tempo zero" will be held in Sala Perla starting at 9 p.m with the award of winners of the competition "Art&Science across Italy". The dialogue with Fabiola Gianotti, Antonio Masiero, Mirko Pojer will start at 21.30, with the participation of the actress Sonia Bergamasco and the pianist Umberto Petrin. Moderator: the RAI journalist Silvia Rosa Brusin.

Click on the pictures for videos and more multimedia contents.

## People

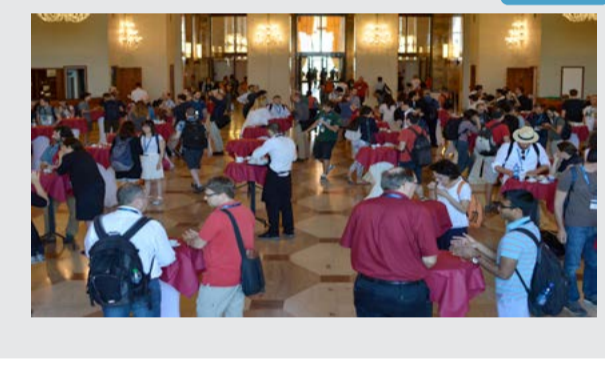


Interview with Myriam Schöenberger, ETH Zürich and CMS experiment



Interview with Michelle Galloway, Universität Zürich and XENON experiment

## Photo Shots



 @epshepp  @HEPPboardEPS

 <http://eps-hep2017.eu/>

## Editorial Board:

Francesca Mazzotta, Francesca Scianitti, Antonella Varaschin, **INFN Communication Office**; Renilde Vanden Broeck, **CERN Press Office**; Natascha Hoermann, **OEAW, Vienna**. Caterina Checchia, **INFN Padova** Silvia Biondi, **INFN Bologna**

The EPS HEP 2017 scientific secretaries. The EPS HEP 2017 Local Organizing Committee.



Istituto Nazionale di Fisica Nucleare

## THE BAR AT THE BEGINNING OF THE UNIVERSE

LUCA RALLI

THREE MORE "QGP SPECIAL" AT THE SEVEN...

AGAIN?

I HATE CERN GUYS

THEY DEMAND QUARK GLUON PLASMA AS IF IT WERE THE SIMPLEST THING IN THE UNIVERSE, JUST BECAUSE THEY HAVE A PARTICLE ACCELERATOR...

I'D REALLY LIKE TO SEE THEM DOING IT WITH A SHAKER...

Luca Ralli '17