

T 54: Invited Topical Talks 3

Time: Wednesday 11:00–12:40

Location: T-H15

Invited Topical Talk T 54.1 Wed 11:00 T-H15
Hunting XYZ Beasts at Belle and Belle II — ●ELISABETTA PRENCIPE for the Belle II-Collaboration — Justus-Liebig-University of Giessen, Giessen, Germany

The search for conventional and non-conventional charmonium states has gained a lot of attention over the past twenty years. It has undoubtedly been shown since 2003 that there are more complex structures than mesons and baryons, and for several of those a non-unique interpretation has been provided, mainly due to the lack of statistics. We refer to these resonant states as X, Y, Z, depending on their properties. Recently the PDG has renamed those that are well established, trying to provide a better understanding. Undoubtedly B factories such as Belle and BaBar have in the past made a notable contribution in filling in the missing blocks of the charmonium spectrum; however, the limited statistics did not allow to search further for these exotic XYZ states.

LHCb collected huge data sets, which allowed to conduct interesting analyses in the *i.e.* search for pentaquarks and the properties of the X(3872). An important contribution to the field will come from the Belle II data, once the planned integrated luminosity is reached, in particular in the search for exotic states in radiative decays, ISR and $\Upsilon(nS)$ transitions, which represent unique physics cases.

Recent spectroscopy results with the complete Belle data sets are discussed, and a summary of results in charmonium and bottomonium spectroscopy is provided with current Belle II data. Future plans with Belle + Belle II combined data sets are then presented.

Invited Topical Talk T 54.2 Wed 11:25 T-H15
Precision tests of the Standard Model using CP violation in B meson decays — ●THIBAUD HUMAIR for the Belle II-Collaboration — Max Planck Institute for Physics, Föhringer Ring 6, 80805 Munich

One of the main goals of the Belle II physics program is to test the flavour sector of the Standard Model to very high precision by measuring the parameters of the CKM triangle, which governs quark mixing. This talk focuses on the measurements of two of these parameters: the angles alpha and beta.

The angle alpha requires to measure direct CP violation in various charmless, rare, modes. These modes require excellent performances in background reduction and in the reconstruction of neutrals. The

angle beta is accessed through time-dependent measurements of CP violation. These measurements require a very good B vertex resolution, excellent flavour tagging capabilities and a perfect understanding of the detector response. I will present recent Belle II results in both types of measurements, and discuss the future prospects for analyses of highest possible precision.

Invited Topical Talk T 54.3 Wed 11:50 T-H15
Back to the top: charting the bounds of the standard model — ●AFIQ ANUAR — Deutsches Elektronen Synchrotron (DESY), Notkestraße 85, D-22607 Hamburg

The top quark, the most massive member of the standard model, is unique in that it is the only known fermion with a Yukawa coupling of order one. In addition, its short lifetime provides us with the only opportunity to study a quark prior to hadronization. These advantages make it among our best probes in searches for physics beyond the standard model. At the same time, the stream of negative results in searches of specific extensions of the standard model from the LHC makes the use of effective approaches increasingly attractive. In this talk, experimental analyses where such approaches are employed will be discussed, ranging from interpretations of precise standard model measurements to direct constraints on effective operators through the use of advanced statistical methods.

Invited Topical Talk T 54.4 Wed 12:15 T-H15
Dark matter from spin-2 mediators — ●STEFAN VOGL — University of Freiburg

Dark matter interacting with massive spin-2 mediators is an intriguing possibility. However, due to the high energy behavior of longitudinal modes of spin-2 particles, the rate of DM annihilation into the mediators exhibits a tremendous growth as soon the channel is kinematically open. To have a consistent effective theory for the spin-2 particle, we analyze an extra-dimensional model such that the mediator(s) are the Kaluza-Klein (KK) modes of the 5D graviton. We find that including the full KK-tower in the computation reduces the annihilation rate by an order of magnitude or more. This casts some doubt on the universal applicability of previous studies with spin-2 mediators within an EFT framework and indicates that a careful consideration of UV physics is required to accurately capture the phenomenology.