

Seminarium Szkoły Doktorskiej NCBJ

Thursday, 22 June, 9:15

room 207, Pasteura 7

<https://www.gotomeet.me/NCBJmeetings/phd-seminar>

<https://events.ncbj.gov.pl/e/PhDSeminar2223>

Speaker:

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Title:

Exotic Hadrons

Abstract:

Out of all the unexpected elementary particles discovered in the past two decades, the 30 or so observed exotic hadrons candidates i.e., ones that do not fit into the paradigms of either bosonic or fermionic baryons. A new era in the study of QCD exotica began in 2003 with the accidental discovery of the X(3872) by the Belle Collaboration, noticed a narrow peak in the invariant mass spectrum of the $\pi^+\pi^-J/\psi$ system. Most of these states discovered have masses in the same region as conventional charmonium states (charmonium-like) or bottomonium-like. Although being the most unambiguous candidates for exotic hadrons observed to date, no scientific consensus has yet emerged to explain all of them and their formation, properties, structure by means of a single, universal theoretical principle. The LHCb announced in 2022 the discovery of a new penta-quark particle and a doubly electrically charged tetra-quark with its neutral counterpart, with a staggering statistical significance of 7.3 sigma and 6.5 sigma, respectively. It is this pattern of one unexpected result after another, with the emergence of desperately few connections, that has characterized the last 20 years of experimental studies in this field. This presentation is aimed at introducing this rapidly expanding field of QCD exotica, theoretical aspects and experimental techniques used for studying these incredible anomalies.