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Non-Resonant Searches for Axion-Like Particles at the LHC

Wednesday, 28 July 2021 09:30 (15 minutes)

We discuss non-resonant ALP-mediated diboson production, a collider probe for axion-like particles (ALPs) which takes advantage of the derivative nature of their interactions with Standard Model particles; here ALPs participate as off-shell mediators of $2 \rightarrow 2$ scattering processes at colliders like the LHC. The power of this novel type of search was first tested by deriving limits on ALP couplings to gauge bosons via processes like $gg \rightarrow ZZ$ using Run 2 CMS public data, probing previously unexplored areas of the ALP parameter space. Other non-resonant searches involving the ALP couplings to other electroweak bosons and/or the Higgs particle are presented. LHC experiments are now searching for these processes using the full Run 2 data samples. In addition, new studies on non-resonant ALP-mediated Vector-Boson Scattering (VBS) and preliminary results based on recently published CMS data are presented. Expectations for LHC Run 3 and HL-LHC are derived.

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Collaboration / Activity

Particle Physics exp. / pheno.

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