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Update of the Jefferson Lab Eta Factory and the Search for BSM Physics

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The planned Jefferson Lab Eta Factory (JEF) experiment relies on the construction of an updated electromagnetic calorimeter in the forward region of the GlueX detector in Hall D, to detect photons from eta and eta' meson rare neutral decays. Focus on these decay channels is motivated by the search for signatures beyond the Standard Model, probing portals that couple the SM sector to the dark sector via new gauge bosons (e.g., dark scalar (S) and lepto-phobic dark vector (B) bosons) in the invariant mass region below 1 GeV. In addition, these decays will allow access to certain C-violating/P-conserving reactions, as well as test chiral perturbation theory to O(p6) expansion. Updating the inner region of the Forward Calorimeter (FCAL) of the GlueX detector to higher granularity PbWO4 crystals will improve the reconstruction of multi-photon final states, minimize shower overlaps and optimize the energy and position resolutions. Machine Learning algorithms are being employed to improve shower classification and separation capabilities of the FCAL and will be compared to conventional reconstruction algorithms.

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Please select: Experiment or Theory

Experiment

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