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Gluonic Excitations and Experimental Hall-D at Jefferson Lab

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A new tagged photon beam facility is being constructed in experimental Hall-D at Jefferson Lab as a part of the 12 GeV upgrade program. The 9 GeV linearly-polarized photon beam will be produced via coherent Bremsstrahlung using the CEBAF electron beam, incident on a diamond radiator. The GlueX experiment in Hall-D will use this photon beam to search for and study the pattern of gluonic excitations in the meson spectrum produced through photoproduction reactions with a liquid hydrogen target.

Recent lattice QCD calculations predict a rich spectrum of hybrid mesons, that are formed by exciting the gluonic field that couples the quarks. A subset of these hybrid mesons are predicted to have exotic quantum numbers which cannot be formed from a simple $q\bar{q}$ pair, and thus provide an ideal laboratory for testing QCD in the confinement regime. In this talk the status of the construction and installation of the GlueX detector will be presented, in addition to simulation results for some reactions of interest in hybrid meson searches. Finally, we will present some highlights from the other proposed Hall-D experimental programs.

Primary author: STEVENS, Justin (Massachusetts Institute of Technology)

Presenter: STEVENS, Justin (Massachusetts Institute of Technology)

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