COLLOQUIUM

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Search for Gluonic Resonances with GlueX

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Abstract

The gluon accounts for more than 98% of the mass of ordinary matter in the universe, and yet it remains mostly invisible to experiment. Its existence is clearly imprinted on high-energy scattering, but at lower energies where their coupling to quarks is stronger, gluons are mostly cloaked by the unique self-screening properties of the strong interaction. An outstanding exception to this would be the possible existence of resonances in the excited hadron spectrum which could be clearly identified with oscillations of the gluonic field. Lattice QCD calculations indicate that such states should exist within the 1.5 - 2.5 GeV mass range. The Gluonic Excitations experiment (GlueX) has recently started up at Jefferson Lab, with a primary physics objective of mapping the meson spectrum within this mass range, and resolving the question of the existence of these so-called "exotic" states. This mapping involves collecting large quantities of data on many final states, each consisting of many final-state particles, and analyzing them all within a single coherent framework of interfering quantum amplitudes known as "partial wave analysis". Commissioning of the experiment was completed in 2017, and by now over 2 PB of experimental data have been collected. Data taking is going on right now, and analysis of data taken last year is still underway. Early results from the data analyzed so far will be shown, together with prospects for what comes next.

Monday, April 16, 2018 at 3:00 pm
SERC, Room 116
Refreshments will be served at 2:45 pm