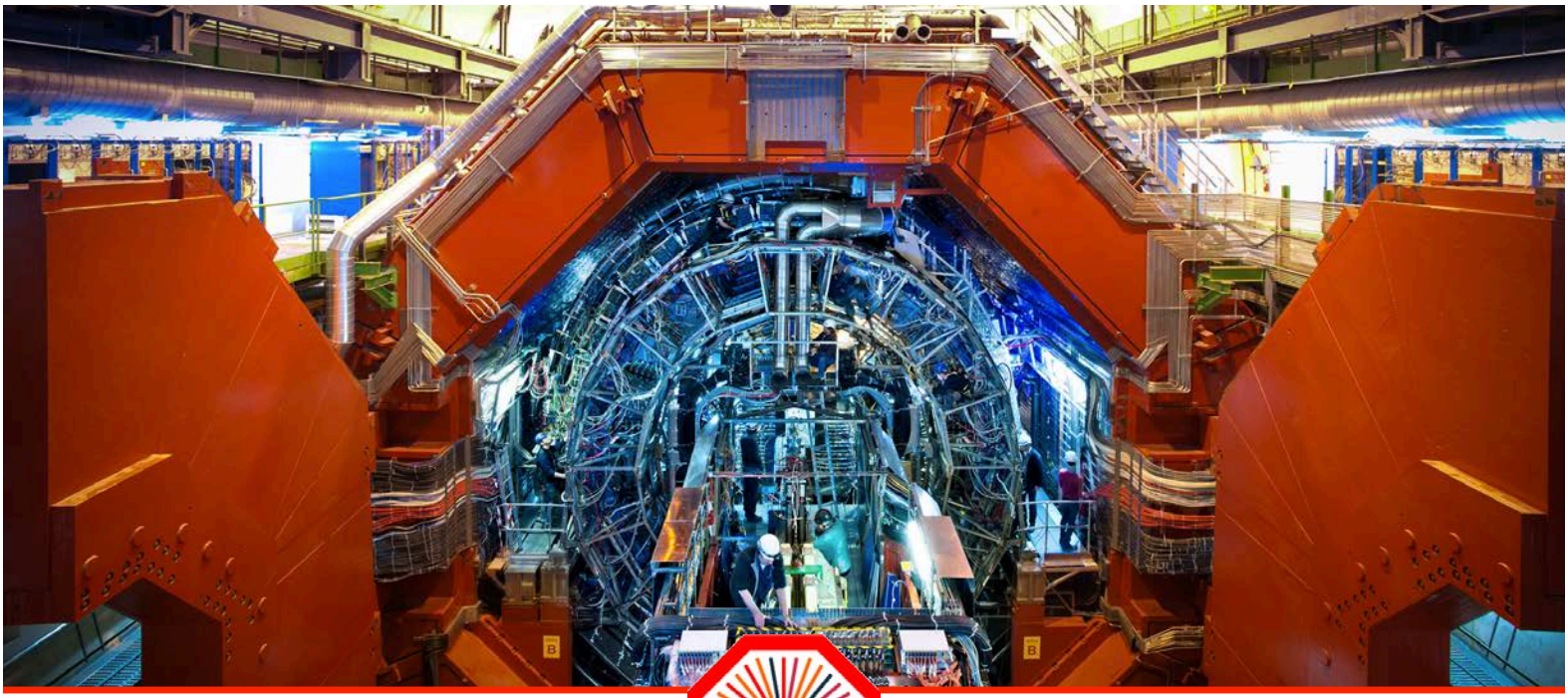

Studies in Photoproduction of Charm-Anticharm Resonances in Ultra-Peripheral Collisions of Lead Ions in ALICE at the LHC

Barak R. Gruberg

Thesis Defense

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Abstract: The research presented in this thesis was carried out with the ALICE (A Large Ion Collider Experiment) detector at the CERN (European Organization for Nuclear Research) LHC (Large Hadron Collider). Two feasibility studies are conducted for Run 2 energies at the LHC. The first case studies the photo-production process of the η_c meson decaying to a four particle final state, $\pi^+\pi^-K^+K^-$ in Pb-Pb ultra-peripheral collisions (UPCs). The second case studies the two-photon production of an all charmed tetraquark state decaying into a four lepton final state.

The simulations for the first case predict a total of about one hundred candidates in a data sample with an integrated luminosity of 1 nb^{-1}. The preliminary studies for the all charged tetraquark suggest a small signal with negligible background might be expected.

A preliminary analysis is performed using 2011 Run 1 lead-lead data corresponding to a total integrated luminosity of 23 μb^{-1}. For both cases, η_c and an all charmed exotic meson, possible hints of the resonance are observed but no conclusive results can be inferred.

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