



LHC Seminar

SPEAKER: Nathan Philip Jurik (Syracuse University (US))

TITLE: **Observation of J/ψ resonances consistent with pentaquark states in $\Lambda_b \rightarrow J/\psi p K^-$ decays at LHCb**

DATE: Tue 22/09/2015 11:00

PLACE: Main Auditorium

ABSTRACT

It has now been over 50 years since the inception of the quark model. The original papers by Gell-Mann and Zweig included the description of the now well known three-quark baryons and quark-antiquark mesons. They also included the possibility of "exotic" hadrons, such as mesons containing two quarks and two antiquarks (tetraquarks), or four quarks and an antiquark (pentaquarks). There is no clear reason why such exotic combinations of quarks should not exist. Indeed, in recent years strong tetraquark candidates have been discovered. However, until recently the observation of any lasting pentaquark candidates had eluded all searches. Using the LHCb Run 1 dataset, two J/ψ resonances consistent with pentaquark states have been observed in $\Lambda_b \rightarrow J/\psi p K^-$ decays. I will describe a full amplitude analysis which was performed in order to be most sensitive to the underlying physics and best study the resonant nature of these states. These states are overwhelmingly significant, and mark the first convincing observation of pentaquark candidates.