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LHCb measurements of the exotic tetraquark candidate X(3872) in high multiplicity pp and pPb collisions

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The last decade of hadron spectroscopy has unveiled a wealth of states that do not have the properties expected of particles composed of 2 or 3 valence quarks. Among the most intriguing of these exotics is the X(3872), which various models attempt to describe as a hadronic molecule, a compact tetraquark, an unexpected charmonium state, or their mixtures. To date, most experimental studies of the X(3872) have focused on its production through B meson decays. Heavy ion collisions, as well as high multiplicity pp collisions, offer a new window on the properties of this poorly understood hadron. In these systems, promptly produced X(3872) hadrons can interact with other particles in the nucleus and/or those produced in the collision. The influence of these interactions on the observed X(3872) yields provides information that can help discriminate between the various models of its structure, as well as give insight into the dynamics of the bulk particles produced in these collisions.

With a full range of precision vertexing, tracking, and particle ID capabilities covering 2 to 5 in units of rapidity, the LHCb experiment is especially well suited to measurements of both prompt and non-prompt exotic hadrons. This talk will present new LHCb measurements X(3872) production in high multiplicity pp collisions and pPb collisions through the decay to $J/\psi\pi^+\pi^-$. This is the first measurement of any exotic hadron in collisions involving a large nucleus.

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