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Multi-pion Meson Productions in Diffractive and Central Productions at COMPASS and at ALICE

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Recent results on (pi pi pi)− from COMPASS from a study of the reaction
pi- p -> pi+ pi- pi- + p at 190 GeV/c.
A new state is found, at mass = 1420 GeV with JPC = 1++ and decaying to f0(980)pi− and f0(980) pi+pi−. This state has never been seen before and never been predicted by theorists or anticipated by experimentalists on meson spectroscopy. Because of its very small cross section, it is NOT likely to be a quarkonium but an exotic meson consisting of tetra-quarks ($q^{-}q$)0 + ($q^{-}q$)− or it could be a gluonic hybrid ($q^{-}q$)− + (a valence gluon), where q's stand for the light-mass quarks, i.e. q = {u, d, s}.
ALICE Collaboration are currently analyzing the (pi+pi−)0 and (pi+pi−pi+pi−)0 systems produced in a central production via double-Pomeron or Pomeron-Reggeon exchanges from p+p at 7 TeV. Recent results from partial-wave analyses of the two- and four-pion systems are presented.

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