“Coherent Production of Parabosons of Order 2”

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A parameter-free statistical model is used to study multiplicity signatures for the coherent production of charged-pairs of parabosons of order p=2 in comparison with those arising in the case of ordinary bosons, p=1. One physical consequence of “order 2” is that two or less such bosons can occupy a totally anti-symmetric state. The investigation is partially motivated by phenomenological coherence analyses, circa 1970, of inelastic pi^{+} pi ^{-} pair production from fixed targets with laboratory kinetic-energies from below threshold to 27 GeV by C.P. Wang, and by Horn and Silver. In the analogous paraboson statistical model, two non-negative real parameters now arise because “ab” and “ba” are fundamentally distinct pair operators of charge ‘+1’, A-quanta and charge ‘-1’, B-quanta parabosons. In 3D plots of the probability of “m” paraboson charged-pairs plus “q” positive parabosons" versus <n> and <n^2>, the p=1 curve is surprisingly found to lie on the relatively narrow 2D p=2 surface. Hence, in the usual two-dimensional projection-plot of such pair probabilities versus the multiplicity <n> , a paraboson signature is that instead of curves there are relatively narrow bands, due to the projection of the varying-width folded ribbons.