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Discovery of a quasi-dynamical symmetry along the arc of regularity

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Exact or approximate (quasi-dynamical) symmetries in the framework of the Interacting Boson Approximation model have been identified over the years only at the vertices or along the sides of its symmetry triangle. The first example of an empirically manifested quasi-dynamical symmetry in the interior of the symmetry triangle of the IBA has been recently identified in the limit of large boson numbers. A line, along which spectra exhibit nearly exact SU(3) degeneracies, is found, extending from the SU(3) vertex to near the critical line of the first order phase transition. The SU(3) degeneracies deteriorate with decreasing boson number, but the location of the line remains almost invariant, lying close the Alhassid–Whelan arc of regularity, the unique interior region of regular behavior connecting the SU(3) and U(5) vertices, thus offering a symmetry- based interpretation of that narrow zone of regularity amidst nearby regions corresponding to more chaotic spectra.