Euclidean dynamical symmetry in nuclear shape phase transition

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A novel algebraic model with Euclidean dynamical symmetry in five dimension, called *F(5)*, is proposed. It is shown that the Euclidean dynamical symmetry arises naturally at the critical point of the *U(5)-SO(6)* transition in the interacting boson model. More importantly, structural evolution from the *E(5)* to *X(5)* critical point symmetry is realized in the model with a nonlinear projection, which thus provides a unified symmetry-based way to describe shape phase transition occurring around the critical line connecting the *U(5)-SO(6)* and the *U(5)-SU(3)* critical points.