

Classification of quantum deformations for the complex $D=4$ homogeneous Lie symmetry and its real forms: Euclidian, Lorentzian, Kleinian and quaternionic

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Complete list of classical r -matrices for $D = 4$ complex homogeneous orthogonal Lie algebra $\mathfrak{o}(4; \mathbb{C})$, the rotational symmetry of four-dimensional complex space-time, is found. Applying reality conditions we obtain the classical r -matrices for all possible real forms of $\mathfrak{o}(4; \mathbb{C})$: Euclidean $\mathfrak{o}(4)$, Lorentz $\mathfrak{o}(3, 1)$, Kleinian $\mathfrak{o}(2, 2)$ and quaternionic $\mathfrak{o}^*(4)$ Lie symmetries.