Explicit quantizations of $U_q(o(4;C))$ and its real forms

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We construct a complete list of explicit quantum deformations of $D = 4$ complex homogeneous orthogonal Lie algebra the rotational symmetry of four-dimensional complex space-time, by providing corresponding universal R-matrices. Further applying suitable reality conditions we obtain the Hopf-algebraic quantum deformations 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 $\mathfrak{o}^\star(4)$ Lie algebras. For $\mathfrak{o}(3,1)$ we re-derive well-known results obtained previously by the authors, but for other real Lie algebras (Euclidean, Kleinian, quaternionic) as well as for the complex Lie algebra $\mathfrak{o}(4;\mathbb{C})$ we provide new results