Iorgov, Nikolai
On the center of $q$-deformed algebra $U_q'(so_3)$ related to quantum gravity at $q$ a root of 1. (English) [Zbl 1092.17009]

The goal of this paper is to describe in an explicit form the algebraic dependence among the elements of the centre of the Fairlie-Odesskii algebra $U_q'(so_3)$ for the case where $q$ is a root of unity. The algebra in question is known to arise as an algebra of observations in quantum gravity in the (2+1)-dimensional de Sitter space. In order to achieve this goal the author employs the realization of $U_q'(so_3)$ in terms of quantum geodesics on a (noncommutative) torus with one hole. It turns out that the dependence in question is expressed via the Chebyshev polynomials. This result is further applied for the study of cyclic representations of $U_q'(so_3)$ with $q$ being a root of unity.

For the entire collection see [Zbl 0989.00035].

Reviewer: A. Sergyeyev (Kyïv)

MSC:
17B37 Quantum groups (quantized enveloping algebras) and related deformations
17B10 Representations of Lie algebras and Lie superalgebras, algebraic theory (weights)
17B81 Applications of Lie (super)algebras to physics, etc.
58B34 Noncommutative geometry (à la Connes)
81R50 Quantum groups and related algebraic methods applied to problems in quantum theory

Keywords:
quaternion algebras; Fairlie-Odesskii algebra; quantum tori; quantum gravity; Casimir elements