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The dual descriptions of the Askey-Wilson algebra $AW(n)$

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The Askey–Wilson algebra $AW(3)$ first appeared as the algebra encoding the bispectrality of the eponym polynomials. Later, it has also been described as the commutant of the $U_q(\mathfrak{su}(1,1))$ algebra in its threefold tensor product. This new description has been generalized to the n-fold tensor product to define a higher rank analog of the algebra, $AW(n)$.

I will present a description of the Askey–Wilson algebra $AW(3)$ that is dual (in the sense of Howe) to the $U_q(\mathfrak{su}(1,1))$ one. $AW(3)$ will be obtained as a commutant of the $\mathfrak{o}_{q^{1/2}}(2) \oplus \mathfrak{o}_{q^{1/2}}(2) \oplus \mathfrak{o}_{q^{1/2}}(2)$ algebra in q-oscillator representations of $\mathfrak{o}_{q^{1/2}}(6)$. It will be shown that this construction is related to the dual pair $U_q(\mathfrak{su}(1,1)) \times \mathfrak{o}_{q^{1/2}}(6)$.

Owing to the fact that $U_q(\mathfrak{su}(1,1)) \times \mathfrak{o}_{q^{1/2}}(2n)$ is the more general dual pair, the construction will be extended to obtain a description of the arbitrary rank Askey–Wilson algebra $AW(n)$ as a commutant of $\mathfrak{o}_{q^{1/2}}(2)^{\oplus n}$ in q-oscillator representations of $\mathfrak{o}_{q^{1/2}}(2n)$.

This is joint work with Luc Frappat (Annecy), Eric Ragoucy (Annecy) and Luc Vinet (CRM).

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