

Dynamical Symmetry of the Zwanziger problem in non-commutative quantum mechanics

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The non-relativistic hydrogen atom and the Zwanziger problem have the same dynamical symmetry for bound and scattering states. We show that this is also true for a Hilbert space which is non-commutative in co-ordinates. The group structure is described using the redefined velocity operator and Laplace Runge-Lenz operator in terms of left and right handed representations of the non-commutative Hilbert space $R3\lambda$. The bound state algebra is $SO(4)$ and the scattering state algebra is $SO(3, 1)$.