

5 Superconformal quantum mechanics and nucleons

[S. Fubini and E. Rabinovici, NPB **245**, 17 (1984)]

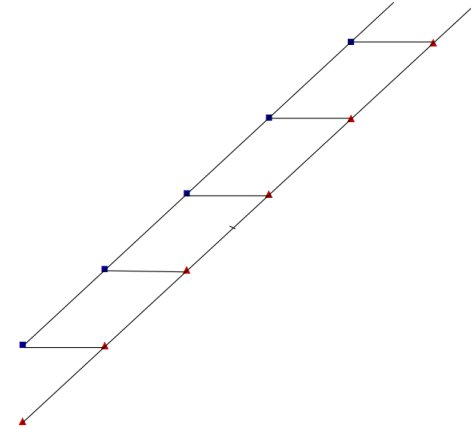
[GdT, H.G. Dosch and S. J. Brodsky, PRD **91**, 045040 (2015)]

- SUSY QM contains two fermionic generators Q and Q^\dagger , and a bosonic generator, the Hamiltonian H
[E. Witten, NPB **188**, 513 (1981)]
- Closure under the graded algebra $sl(1/1)$:

$$\frac{1}{2}\{Q, Q^\dagger\} = H$$

$$\{Q, Q\} = \{Q^\dagger, Q^\dagger\} = 0$$

$$[Q, H] = [Q^\dagger, H] = 0$$



- Since $[Q^\dagger, H] = 0$, the states $|E\rangle$ and $Q^\dagger|E\rangle$ have identical eigenvalues E , but for a zero eigenvalue we can have the trivial solution $|E = 0\rangle = 0$
- For a conformal theory

$$Q = \psi^\dagger \left(-\frac{d}{dx} + \frac{f}{x} \right), \quad Q^\dagger = \psi \left(\frac{d}{dx} + \frac{f}{x} \right)$$

where ψ and ψ^\dagger are spinor operators with $\{\psi, \psi^\dagger\} = 1$ and f is dimensionless