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**Irreducibility Criterion of a Highest Weight Representation
of the $\mathfrak{sl}(2)$ Loop Algebra and the XXZ Spin Chain at Roots
of Unity**

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Recently it has been shown that the XXZ spin chain at roots of unity has the $\mathfrak{sl}(2)$ loop algebra symmetry. In this poster presentation we present a necessary and sufficient condition for a finite-dimensional highest weight representation of the $\mathfrak{sl}(2)$ loop algebra to be irreducible (T. Deguchi, math-ph/0610002.) The irreducibility criterion is fundamental to investigate the degenerate multiplicity of a given energy level of the XXZ spin chain at roots of unity. In fact, every finite-dimensional representation should be given by a highest weight representation or a collection of highest weight representations.