1 Referee Report

This paper is a very interesting novel elaboration on the problem of establishing the complete quantum group structure underlying the Hubbard model - AdS/CFT scattering theory. This work derives the correct Lie bialgebra via a reduction procedure, utilising the construction of particular representations. This represents an exciting new instalment of this long-term mathematical project, which one of the authors has been importantly pursuing since its inception.

The paper is written extremely clearly and with mathematical rigour, and the analysis is very thorough. I recommend the publication of this paper.

I only have very few comments which the authors may or may not decide to consider. I do not make addressing these points a condition for my recommendation, but I consider them merely as an opportunity for an interesting discussion.

1. It is fascinating to consider what the string theory analogue of this contraction procedure might be, if an analogue or an origin in string theory can be at all found. In general, what the worldsheet shadow of this contraction might be is an interesting question, and whether there is a master integrable system which realises this at a Lagrangian level.

2. It is important to comment on whether this procedure can be quantised, to allow access to the quantum algebra, and whether this formidable problem is now made more accessible in any way via the route highlighted by these new technique.