

q -SERIES AND QUANTUM MODULAR FORMS

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ABSTRACT

While the theory of mock modular forms has seen great advances in the last decade, questions remain. We revisit Ramanujan's last letter to Hardy, and prove one of his remaining conjectures as a special case of a more general result. Quantum modular forms, defined by Zagier, as well as Dyson's combinatorial rank function, the Andrews-Garvan crank function, and mock theta functions, all play key roles. Along these lines, we also show that the Rogers-Fine false theta functions, functions that have not been well understood within the theory of modular forms, specialize to quantum modular forms. This is joint work with K. Ono (Emory U.) and R.C. Rhoades (Stanford U.).