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*[Coefficients of Eisenstein Series] An unsolved problem of Ramanujan on the coefficients of the reciprocal of a certain Eisenstein series.*

In their last joint paper, G. H. Hardy and S. Ramanujan established a general theorem which allowed them to determine certain infinite series representations for the coefficients of a class of modular forms of negative weight. They then applied their theorem to the reciprocal of the Eisenstein series  $E_6(\tau)$ . In letters written by Ramanujan to Hardy from nursing homes, Ramanujan offered several more examples, not all of which follow from their general theorem. Except for one claim, all of Ramanujan's assertions about this topic in his letters have been proved by P. Bialek and the author in a forthcoming paper. In this talk, we discuss the unresolved claim of Ramanujan on the coefficients of

$$\frac{1}{2P(q^2) - P(q)},$$

where

$$P(q) := 1 - 24 \sum_{k=1}^{\infty} \frac{kq^k}{1 - q^k}.$$

This is joint work with Bialek. (Received September 19, 2000)