

Eisenstein Series on Covers of Odd Orthogonal Groups

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We study the Whittaker coefficients of the minimal parabolic Eisenstein series on the n -fold cover of the split odd orthogonal group SO_{2r+1} .

If the degree of the cover is odd, then Beineke, Brubaker and Frechette have conjectured that the p -power contributions to the Whittaker coefficients may be computed using the theory of crystal graphs of type C , by attaching to each path component a Gauss sum or a degenerate Gauss sum depending on the fine structure of the path.

We establish their conjecture using a combination of automorphic and combinatorial-representation-theoretic methods. Surprisingly, we must make use of the type A theory, and the two different crystal graph descriptions of Brubaker, Bump and Friedberg available for type A based on different factorizations of the long word into simple reflections. We also establish a formula for the Whittaker coefficients in the even degree cover case, again based on crystal graphs of type C .

As a further consequence, we establish a Lie-theoretic description of the coefficients for n sufficiently large, thereby confirming a conjecture of Brubaker, Bump and Friedberg.