

EIGENFORM PRODUCT IDENTITIES FOR DEGREE-TWO SIEGEL MODULAR  
FORMS

**Alexandra M Walsh**

(alexandra\_walsh@brown.edu)

*Clemson University*

[Mentor:Jim Brown]

**Abstract of Report Talk:** In his paper “On Eigenform Relations Between Monomial Series” (2000), Eknath Ghate proves that there are finitely many pairs of full-level, degree-one eigenforms  $f$  and  $g$  whose product  $fg$  is also an eigenform. We prove a partial generalization of this theorem for degree-two Siegel modular forms. The problem splits into two cases: in case one,  $FG$  is an Eisenstein series, and in case two,  $FG$  is a cusp form. For the Eisenstein series case, we use the Siegel  $\Phi$  operator, a mapping from Siegel degree-two to degree-one modular forms, to show that there is only one pair of Eisenstein series eigenforms  $F$  and  $G$  for which  $FG$  is an eigenform. For the cusp form case, we use the Rankin-Selberg method to give a condition under which  $FG$  cannot be an eigenform. We provide one example of an eigenform product for which  $FG$  is a cusp form, and we conjecture that this is the only such example.

[Joint work with Hugh Geller, Rico Vicente]

Received: July 23, 2018