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**Kariane Calta\*** ([kcalta@math.cornell.edu](mailto:kcalta@math.cornell.edu)), Dept. of Math, Malott Hall, Cornell University, Ithaca, NY 14850, and **John Smillie** ([smillie@math.cornell.edu](mailto:smillie@math.cornell.edu)), Dept. of Math, Malott Hall, Cornell University, Ithaca, NY 14850. *Exceptional surfaces, the J-invariant and algebraic periodicity.*

In this talk, we briefly summarize certain results of Calta and McMullen regarding lattice surfaces and completely periodic surfaces in genus two. We describe the J-invariant defined by Kenyon and Smillie and algebraic analogs of complete periodicity for surfaces and directions. These algebraic analogs are related to the J-invariant and are introduced in joint work by Calta and Smillie. They allow us to extend some of the more algebraic results of Calta and McMullen in genus two to surfaces of arbitrary genera. (Received September 06, 2006)