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**Christopher R Policastro\*** (cpoli@mit.edu), 450 Memorial Drive, Cambridge, MA 02139.

*Category  $\mathcal{O}$  for the Rational Cherednik Algebra of  $G_{12}$ .*

The rational Cherednik algebra of a complex reflection group  $W$  with reflection representation  $\mathfrak{h}$  is defined as a deformation of the algebra  $\mathbb{C}[W] \ltimes S(\mathfrak{h}^* \oplus \mathfrak{h})$  depending on certain complex parameters. In this paper, we describe the irreducible representations in category  $\mathcal{O}$  of the rational Cherednik algebra associated to  $G_{12}$ , in the Shephard-Todd notation, for an arbitrary complex parameter. In particular, we determine semisimplicity conditions on the category, Grothendieck group expressions for irreducible modules, and the characters for each irreducible finite dimensional representation. The determination of the structure of  $\mathcal{O}$  uses computational and algebraic methods that should be easily applicable to other two dimensional complex reflection groups in the case of equal parameters. (Received September 07, 2010)