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**Lee Kyungyong** and **Li Li\*** (llpku@math.uiuc.edu), Math Department, University of Illinois at Urbana-Champaign, Urbana, IL 61801. *On the algebra and combinatorics of  $q, t$ -Catalan numbers.*

Haiman proved that the  $q, t$ -Catalan number is the Hilbert series of the graded vector space  $M = \bigoplus M_{d_1, d_2}$  spanned by a minimal set of generators for the ideal of the diagonal locus of  $(\mathbb{C}^2)^n$ . It is natural to ask for a combinatorial construction of such generators. In this talk we give upper bounds for the dimension of  $M_{d_1, d_2}$  in terms of partition numbers, and find all bi-degrees  $(d_1, d_2)$  that attain equality. For these bi-degrees, we answer the aforementioned question. (Received February 14, 2010)