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Cristian Lenart, Satoshi Naito, Daisuke Sagaki, Anne Schilling and Mark Shimozono*
(mshimo@math.vt.edu), Department of Mathematics, Virginia Tech, Blacksburg, VA 24061. *Level zero Littelmann paths, Kirillov-Reshetikhin crystals, parabolic quantum Bruhat graph, and Macdonald polynomials.*

We give several explicit combinatorial formulas for the specialization of a Macdonald polynomial $P_\lambda(x; q, t)$ at $t = 0$. For simply-laced type, Ion showed that $P_\lambda(x; 1, 0)$ is a Demazure character in a highest weight crystal for the untwisted affine algebra, and Fourier and Littelmann proved that this character is a product of fundamental Kirillov-Reshetikhin (KR) characters. In general type, the Macdonald specialization is not a Demazure character. However we prove that $P_\lambda(x; q, 0)$ is the product of KR characters, graded by the energy function. Along the way we obtain several explicit combinatorial formulas for this graded character: (1) Lakshmibai-Seshadri (canonical Littelmann) paths for a level-zero weight for the untwisted affine algebra, projected to the finite weight lattice; (2) certain walks in the parabolic quantum Bruhat graph, which comes from quantum cohomology of homogeneous spaces; (3) alcove walks controlled by the Borel quantum Bruhat graph. (Received August 22, 2012)