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**Andrew Crites\*** ([acrites@uw.edu](mailto:acrites@uw.edu)), Department of Mathematics, University of Washington, Box 354350, Seattle, WA 98195-4350, and **Sara Billey** ([billey@uw.edu](mailto:billey@uw.edu)), Department of Mathematics, University of Washington, Box 354350, Seattle, WA 98195-4350. *Pattern characterization of rationally smooth affine Schubert varieties of type A.*

Schubert varieties in finite dimensional flag manifolds  $G/P$  are a well-studied family of projective varieties indexed by elements of the corresponding Weyl group  $W$ . In particular, there are many tests for smoothness and rational smoothness of these varieties. One key result due to Lakshmibai-Sandhya is that in type  $A$  the smooth Schubert varieties are precisely those that are indexed by permutations that avoid the patterns 4231 and 3412. Recently, there has been a flurry of research related to the infinite dimensional analogs of flag manifolds corresponding with  $G$  being a Kac-Moody group and  $W$  being an affine Weyl group or parabolic quotient. In this paper we study the case when  $W$  is the affine Weyl group of type  $A$  or the affine permutations. We develop the notion of pattern avoidance for affine permutations. Our main result is a characterization of the rationally smooth Schubert varieties corresponding to affine permutations in terms of the patterns 4231 and 3412 and the twisted spiral permutations. (Received August 31, 2010)