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### **The Smoothness of Convolutions of Singular Orbital Measures on Complex Grassmannians**

It is well known that if  $G/K$  is any irreducible symmetric space and  $\mu_a$  is a continuous orbital measure supported on the double coset  $KaK$ , then the convolution product,  $\mu_a^k$ , is absolutely continuous for some suitably large number  $k \leq \dim G/K$ . The minimal value of  $k$  is known in some symmetric spaces and in the special case of compact groups or rank one compact symmetric spaces it has even been shown that  $\mu_a^k$  belongs to the smaller space  $L^2$  for some  $k$ . Here we prove that this  $L^2$  property holds for all the compact, complex Grassmannian symmetric spaces,  $SU(p+q)/S(U(p) \times U(q))$ . Moreover, for the orbital measures at a dense set of points  $a$ , we prove that  $\mu_a^2 \in L^2$  (or  $\mu_a^3 \in L^2$  if  $p = q$ ).

**Keywords:** Orbital measure, spherical functions, complex Grassmannian symmetric space, absolute continuity.

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