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**A Sharp Criterion for the Existence of the Density in the Product  
Formula on Symmetric Spaces of Type  $A_n$**

We find sharp conditions on  $X, Y \in \mathfrak{a}$  for the existence of the density of the measure  $\delta_{e^X}^{\natural} \star \delta_{e^Y}^{\natural}$  intervening in the product formula for the spherical functions on the symmetric spaces of noncompact type  $\mathbf{X} = \mathbf{SL}(n, \mathbb{F})/\mathbf{SU}(n, \mathbb{F})$  where  $\mathbb{F} = \mathbb{R}, \mathbb{C}$  or  $\mathbb{H}$ . Our results also apply to the symmetric space  $\mathbf{E}_6/\mathbf{F}_4$ .

**Keywords:** Product formula, convolution of measures, semisimple Lie groups.

**MSC:** 43A90, 53C35, 15A18