

SUBROUTINE PDK

PURPOSE - To randomly generate the spherical angles θ and ϕ for a two-body decay where the decay distribution is:

$$\frac{dP}{d\Omega} = \frac{1}{4\pi} (1 + \alpha P \cos \theta)$$

PROCEDURE -

1) Phi: $\phi = 2\pi P$ where P is a random number between 0 and 1

2) Theta: $\theta = \arccos \left\{ \frac{1 - 2\sqrt{\frac{1}{4} + \alpha P (\frac{1}{2} + \frac{1}{4}\alpha P - P)}}{-\alpha P} \right\}$ $\alpha P \neq 0$
 $= \arccos \{1 - 2P\}$ $\alpha P = 0$

VARIABLES -

Input: αP

Output: θ, ϕ