are not particularly interested in the actual amount, unless of course one state dominated. We
do not expect this to be the case however, since the SU(3) related decay $B^0 \rightarrow J/\psi K^{*0}$,
$K^{*0} \rightarrow K^+ \pi^-$ has a substantial components of both $CP$ states; the PDG quotes gives the
longitudinal fraction as $(80 \pm 8 \pm 5)\%$ [7].

The even and odd $CP$ components can be disentangled by measuring the appropriate angular
quantities of each event. Following Dighe et al. [64], we can decompose the decay amplitude
for a $B_s$ as

$$A(B_s \rightarrow J/\psi \phi) = A_0(m_\phi) / E_\phi \epsilon_{J/\psi}^T - A_\parallel \epsilon_{J/\psi}^T / \sqrt{2} - i A_\perp \epsilon_{\phi}^* \cdot \hat{p} / \sqrt{2},$$ (50)

where $\epsilon_{J/\psi}$ and $\epsilon_\phi$ are polarization 3-vectors in the $J/\psi$ rest frame, $\hat{p}$ is a unit vector giving
the direction of the $\phi$ momentum in the $J/\psi$ rest frame, and $E_\phi$ is the energy of the $\phi$ in the
$J/\psi$ rest frame. We note that the corresponding amplitude for the $\bar{B}_s$ decay are $\bar{A}_0 = A_0$,
$\bar{A}_\parallel = A_\parallel$, and $\bar{A}_\perp = -A_\perp$. The amplitudes are normalized so that

$$d\Gamma(B_s \rightarrow J/\psi \phi) / dt = |A_0|^2 + |A_\parallel|^2 + |A_\perp|^2.$$ (51)

The $\phi$ meson direction in the $J/\psi$ rest frame defines the $\hat{x}$ direction. The $\hat{z}$ direction is
perpendicular to the decay plane of the $K^+ K^-$ system, where $p_\psi(K^+) \geq 0$. The decay
direction of the $\ell^+$ in the $J/\psi$ rest frame is described by the angles $(\theta, \phi)$. The angle $\psi$ is that
formed by the $K^+$ direction with the $\hat{x}$-axis in the $\phi$ rest frame. Figure 20 shows the angles.

Figure 20: Pictoral description of the decay angles. On the left $\theta$ and $\phi$ defined in the $J/\psi$
rest frame and on the right $\psi$ defined in the $\phi$ rest frame. (From T. Kuhr [65].)

The decay width can be written as

$$d^4\Gamma[B_s \rightarrow (\ell^+ \ell^-) J/\psi (K^+ K^-)_{\phi}] / d\cos \theta d\phi d\cos \psi dt = \frac{9}{32\pi} [2|A_0|^2 \cos^2 \psi (1 - \sin^2 \theta \cos^2 \phi)$$