

$B \rightarrow P\pi$

Breit Wigner  
form

$$A = f_+ a_{+-} + f_- a_{-+} + f_0 a_{00}$$

$$\bar{A} = f_+ \overline{(a_{-+})} + f_- \overline{(a_{+-})} + f_0 \overline{a_{00}}$$

From Dalitz plot

$$f_i f_i^* \rightarrow |a_i|^2$$

$$f_+ f_0^* \rightarrow \delta_{+0} = \arg(a_+ a_0^*)$$

$$f_- f_0^* \rightarrow \delta_{-0} = \arg(a_- a_0^*)$$

$$f_+ f_-^* \rightarrow \delta_{+-} = \delta_{+0} - \delta_{-0}$$

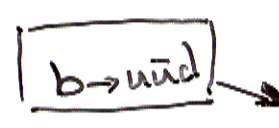
↑  
kinematically challenging

soft  $\pi^0$

with João Silva

What can you do with **Untagged** data?

or **Tagged** but **Time-Integrated**



$$\Delta I = 1/2$$

$$\Delta I = 3/2$$



**Isospin**  $B^0 \rightarrow \pi^+ \pi^- \pi^0$

3 tree amplitudes

2 penguin amplitudes

→ 9 parameters +  $\alpha$

↳ 8 like branching fractions - experiment independent

Fits to Dalitz plot

**Untagged sample** 8/9

+  
Tagged Time-Integrated 9/9

Tagged Time-dependent ⇒  $\alpha$

Possible problems

- Other channels
- Backgrounds

Other channels  $\Leftrightarrow$  more parameters

$$B \rightarrow f_0 \pi$$

$$B \rightarrow (\text{other resonances}) \pi$$

$\hookrightarrow \pi\pi$

$\rightarrow$  generally not much overlap  
with  $\rho$  bands

DeAndrea, Gatto, Nardulli & Santorelli

$$B \rightarrow B^* \pi$$

$$\hookrightarrow \pi\pi$$

$$m_{B^*} \approx m_B \quad \Gamma_{B^*} = 0.2 \text{ keV}$$

$$B \rightarrow B(0^+)$$

$$m_{B^0} = 5694 \text{ MeV}$$

$$\Gamma_{B^0} = 0.36 \text{ GeV}$$

calculate in factorization approximation

$\rightarrow$  significant effects in  $\rho$  bands

(may double  $B^- \rightarrow \pi^+ \pi^- \pi^-$ )

50% effect in  $B^0 \rightarrow \rho^0 \pi^0$

$B \rightarrow \bar{B} \pi$   
 $\quad \quad \quad \downarrow$   
 $\quad \quad \quad \pi \pi$

$\leftrightarrow$  quasi 2 body  
 $\Rightarrow$  definite CP  $\Rightarrow$  not background

another set of I spin amplitudes  
both tree + penguin contributions

in principal can fit for these separately

But 10 more parameters!

needs further study to understand  
whether there is any chance to  
control any of these parameters  
from other measurements.