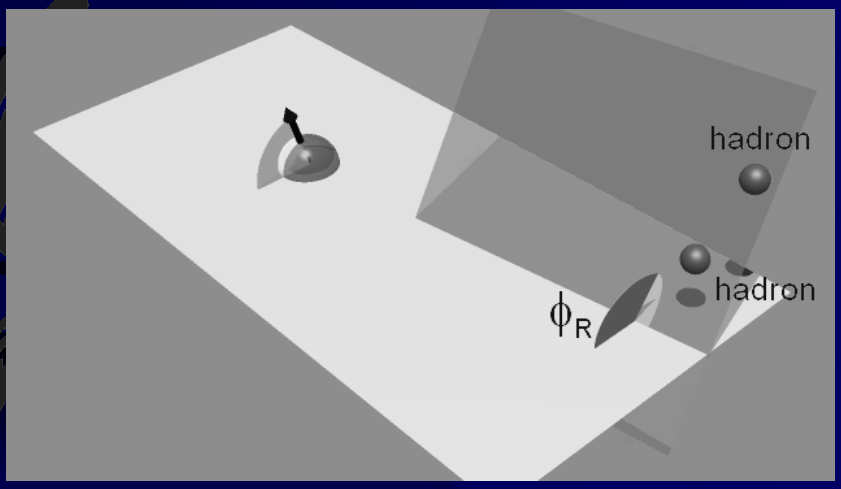
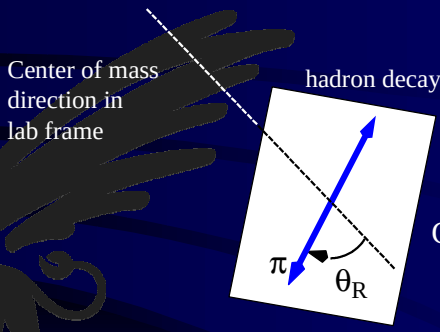
Hadron pair azimuthal angle



Center of mass angle



Polarized Λ production

$$d^7\sigma^{\uparrow} + d^7\sigma^{\downarrow} \propto \left(1 - y + \frac{y^2}{2}\right) f_1(x)\, D_1(z)\, \mathcal{BW}(M^2; M_\Lambda^2)$$

Extremely sharp Breit-Wigner invariant mass distribution

We can perform the integration over four variables

$$\int dM^2 d\theta_R\, d\phi_R\, d\phi_S \left(d^7\sigma^{\uparrow} + d^7\sigma^{\downarrow}\right) \propto 2\pi \left(1 - y + \frac{y^2}{2}\right) f_1(x)\, D_1(z)$$

Polarized Λ production

$$d^7\sigma^{\uparrow} - d^7\sigma^{\downarrow} \propto (1 - y)\cos(\phi_h + \phi_R)$$

$$h_1(x)\, H_1(z)\, \alpha \sin_R \mathcal{BW}(M^2; M_\Lambda^2)$$

Transversity

Λ transversity fragmentation function

We can perform the integration over four variables

$$\int dM^2\, d\theta_R\, d\phi_R\, d\phi_S\, \cos(\phi_R + \phi_S) \left(d^7\sigma^{\uparrow} - d^7\sigma^{\downarrow}\right) \propto \alpha\, 2\pi\, (1 - y)\, h_1(x)\, H_1(z)$$

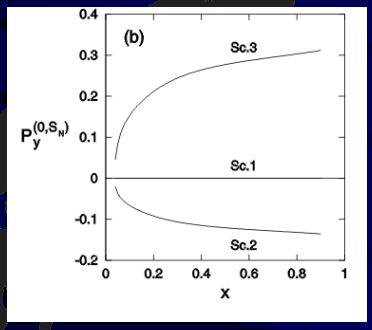
Asymmetry for Λ production

$$A_T \left\langle \cos\left(\phi_h + \phi_S\right)\right\rangle (x,y,z) = \frac{(1-y)}{\left(1-y+\frac{y^2}{2}\right)} \frac{h_1(x)\alpha\, H_1(z)}{f_1(x)\, D_1(z)}$$

$$\alpha = 0.642$$

Estimates of Λ asymmetry

$$\frac{1}{\alpha} A_T \left\langle \cos\left(\phi_h + \phi_S\right)\right\rangle \approx 1.5\, A_T \left\langle \cos\left(\phi_h + \phi_S\right)\right\rangle$$



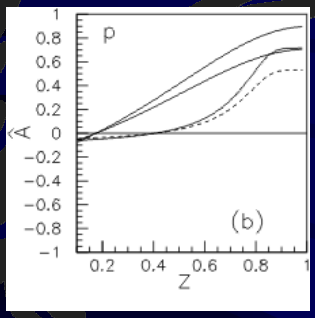
All light quarks contribute equally to the Λ spin

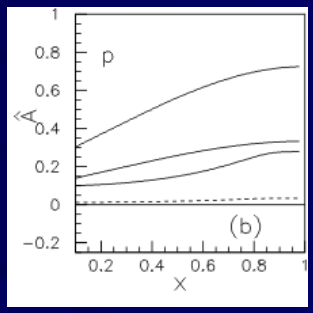
The whole Λ spin is carried by the *s* quark

M. Anselmino, M. Boglione, F. Murgia, PLB 481 (2000)

Estimates of Λ asymmetry

$$\approx 1.5\, A_T \left\langle \cos\left(\phi_h + \phi_S\right) \right\rangle$$





B.-Q. Ma, I. Schmidt, J.-J. Tang, PRD 64 (2001)

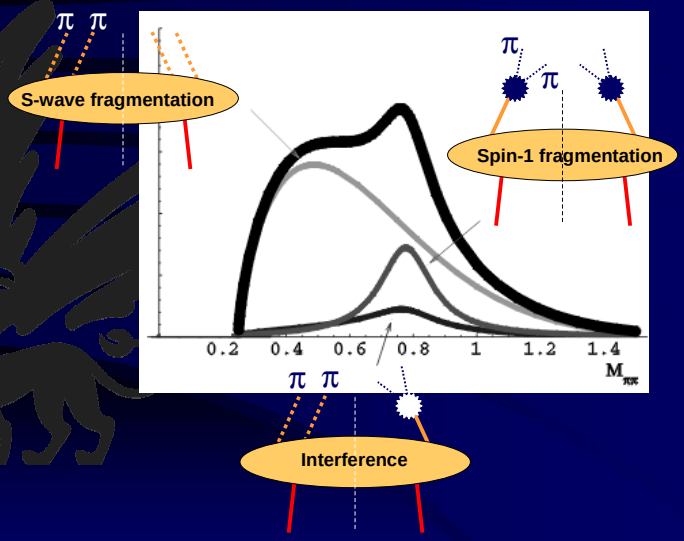
Λ production summary

- The Λ can easily be distinguished from the continuos background.
- The transversity fragmentation function is probably sizable, but is difficult to give a reliable estimate for the asymmetries.
- The evolution of the function is known.

Two-pion fragmentation

$$d^7\sigma^{\uparrow} + d^7\sigma^{\downarrow} \propto \left(1 - y + \frac{y^2}{2}\right) f_1(x)\, D_1(z, \theta_R, \phi_R, M^2)$$

We can perform the integration over three variables

$$\int d\theta_R\, d\phi_R\, d\phi_S \left(d^7\sigma^{\uparrow} + d^7\sigma^{\downarrow}\right) \propto 2\pi \left(1 - y + \frac{y^2}{2}\right) f_1(x)\, D_1(z, M^2)$$

Invariant mass spectrum