| Hadron | Number measured |
|---|---|
| $\pi^+$ | 8.53 |
| $\pi^0$ | 9.18 |
| $K+$ | 1.18 |
| $K^0$ | 1.015 |
| $\eta$ | 0.934 |
| $\rho^0$ | 1.21 |
| $K^{*+}$ | 0.357 |
| $\eta'$ | 0.13 |
| $p$ | 0.488 |
| $\Lambda$ | 0.185 |
| $\Omega$ | 0.0014 |

Table 8.1: Mean multiplicities for a typical $e^+e^-$ collision at $\sqrt{s} = 91.2$ GeV [3]

collision is a hard process, and is easily modelled by Feynman diagrams such as that shown. What as yet is unknown is how to model the process represented by the black horizontal arrow of figure 8.1. Although there may still be some hard processes occurring, the vast majority will be at low energies, especially as the quarks form more and more hadrons. These soft processes represent a difficult conceptual challenge.

Conservation of momentum means that the $\bar{q}q$ pair will be travelling back to back. Conservation of energy means that they will be travelling very fast. Colour confinement forbids the quarks from existing individually, and how they form colour singlet composites is the focus of several theories.

In the **independent model** the $\bar{q}q$ act independently and each combines with quarks and antiquarks spontaneously created from the vacuum to form hadrons.

Alternatively, the **Lund string theory** treats all but the highest-energy gluons as field lines, which are attracted to each other due to the gluon self-interaction and so form a narrow tube (or string) of strong colour field. This