# Illustrative Key to the Particle Listings

Name of particle. "Old" name used before 1986 renaming scheme also given if different. See the section "Naming Scheme for Hadrons" for details.

## $a_0(1200)$

$I^G(J^{PC}) = 1^-(0^{++})$ — Particle quantum numbers (where known).

OMITTED FROM SUMMARY TABLE — Indicates particle omitted from Particle Physics Summary Table, implying particle's existence is not confirmed.

Evidence not compelling, may be a kinematic effect.

Quantity tabulated below.

### $a_0(1200)$ MASS

General comments on particle.

| VALUE (MeV) | EVTS | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| **1206± 7 OUR AVERAGE** | | | | | | |
| 1210± 8±9 | 3000 | FENNER | 87 | MMS | − | 3.5 $\pi^- p$ |
| 1198±10 | | PIERCE | 83 | ASPK | + | 2.1 $K^- p$ |
| 1216±11±9 | 1500 | [1] MERRILL | 81 | HBC | 0 | 3.2 $K^- p$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | | |
| 1192±16 | 200 | LYNCH | 81 | HBC | ± | 2.7 $\pi^- p$ |

Top line gives our best value (and error) of quantity tabulated here, based on weighted average of measurements used. Could also be from fit, best limit, estimate, or other evaluation. See next page for details.

"Document id" for this result; full reference given below.

Footnote number linking measurement to text of footnote.

[1] Systematic error was added quadratically by us in our 1986 edition.

Measurement technique. (See abbreviations on next page.)

### $a_0(1200)$ WIDTH

Number of events *above background*.

| VALUE (MeV) | EVTS | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| **41±11 OUR AVERAGE** Error includes scale factor of 1.8. See the ideogram below. | | | | | | |
| 50± 8 | | PIERCE | 83 | ASPK | + | 2.1 $K^- p$ |
| $70^{+30}_{-20}$ | 200 | LYNCH | 81 | HBC | ± | 2.7 $\pi^- p$ |
| 25± 5±7 | | MERRILL | 81 | HBC | 0 | 3.2 $K^- p$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | | |
| <60 | | FENNER | 87 | MMS | − | 3.5 $\pi^- p$ |

Measured value used in averages, fits, limits, etc.

Scale factor > 1 indicates possibly inconsistent data.

Reaction producing particle, or general comments.

Error in measured value (often statistical only; followed by systematic if separately known; the two are combined in quadrature for averaging and fitting.)

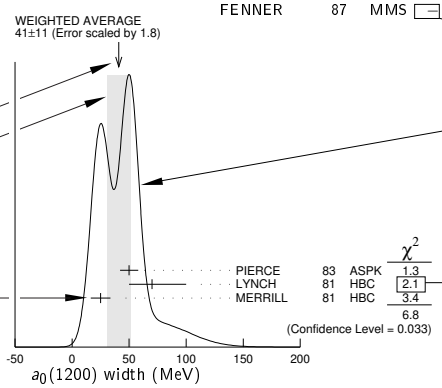
"Change bar" indicates result added or changed since previous edition.

Charge(s) of particle(s) detected.

Measured value *not used* in averages, fits, limits, etc. See the Introductory Text for explanations.

Arrow points to weighted average.

Shaded pattern extends $\pm 1\sigma$ (scaled by "scale factor" S) from weighted average.




Ideogram to display possibly inconsistent data. Curve is sum of Gaussians, one for each experiment (area of Gaussian = 1/error; width of Gaussian = ±error). See Introductory Text for discussion.

Value and error for each experiment.

Contribution of experiment to $\chi^2$ (if no entry present, experiment not used in calculating $\chi^2$ or scale factor because of very large error).

### $a_0(1200)$ DECAY MODES

| Mode | | Fraction ($\Gamma_i/\Gamma$) | Scale factor/ Confidence level |
|---|---|---|---|
| $\Gamma_1$ | $3\pi$ | (65.2±1.3) % | S=1.7 |
| $\Gamma_2$ | $K\overline{K}$ | (34.8±1.3) % | S=1.7 |
| $\Gamma_3$ | $\eta\pi^\pm$ | < 5 $\times 10^{-4}$ | CL=95% |

Partial decay mode (labeled by $\Gamma_i$).

Our best value for branching fraction as determined from data averaging, fitting, evaluating, limit selection, etc. This list is basically a compact summary of results in the Branching Ratio section below.

### $a_0(1200)$ BRANCHING RATIOS

Branching ratio.

**$\Gamma(3\pi)/\Gamma_{total}$** — $\Gamma_1/\Gamma$

| VALUE | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|
| **0.652±0.013 OUR FIT** Error includes scale factor of 1.7. | | | | | |
| **0.643±0.010 OUR AVERAGE** | | | | | |
| 0.64 ±0.01 | PIERCE | 83 | ASPK | + | 2.1 $K^- p$ |
| 0.74 ±0.06 | MERRILL | 81 | HBC | 0 | 3.2 $K^- p$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| 0.48 ±0.15 | [2] LYNCH | 81 | HBC | ± | 2.7 $\pi^- p$ |

Our best value (and error) of quantity tabulated, as determined from constrained fit (using *all significant* measured branching ratios for this particle).

Weighted average of measurements of this ratio only.

[2] Data has questionable background subtraction.

Footnote (referring to LYNCH 81).

**$\Gamma(K\overline{K})/\Gamma_{total}$** — $\Gamma_2/\Gamma$

Branching ratio in terms of partial decay mode(s) $\Gamma_i$ above.

| VALUE | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|
| **0.348±0.013 OUR FIT** Error includes scale factor of 1.7. | | | | | |
| **0.35 ±0.05** | PIERCE | 83 | ASPK | + | 2.1 $K^- p$ |

**$\Gamma(K\overline{K})/\Gamma(3\pi)$** — $\Gamma_2/\Gamma_1$

| VALUE | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|
| **0.535±0.030 OUR FIT** Error includes scale factor of 1.7. | | | | | |
| **0.50 ±0.03** | MERRILL | 81 | HBC | 0 | 3.2 $K^- p$ |

**$\Gamma(\eta(\text{neutral decay})\pi^\pm)/\Gamma_{total}$** — $0.71\Gamma_3/\Gamma$

| VALUE (units $10^{-4}$) | CL% | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| **<3.5** | 95 | PIERCE | 83 | ASPK | + | 2.1 $K^- p$ |

Confidence level for measured upper limit.

### $a_0(1200)$ REFERENCES

References, ordered inversely by year, then author.

| | | | | |
|---|---|---|---|---|
| FENNER | 87 | PRL 55 14 | H. Fenner *et al.* | (SLAC) |
| PIERCE | 83 | PL 123B 230 | J.H. Pierce | (FNAL) UP |
| LYNCH | 81 | PR D24 610 | G.R. Lynch *et al.* | (CLEO Collab.) |
| MERRILL | 81 | PRL 47 143 | D.W. Merrill *et al.* | (SACL, CERN) |

"Document id" used on data entries above.

Partial list of author(s) in addition to first author.

Quantum number determinations in this reference.

Journal, report, preprint, etc. (See abbreviations on next page.)

Institution(s) of author(s). (See abbreviations on next page.)