

## Author index

- Abela, R., 360–1, 382  
 Abramowicz, H., 279  
 Abrams, G.S., 283  
 Abrams, R., 323  
 Abshire, G., 273, 284  
 Adams, M.R., 284, 308  
 Ahlen, S.P., 39, 75  
 Akerlof, C.W., 328, 330, 354  
 Akesson, T., 355  
 Al-Agil, I., 76  
 Alberis, T., 175  
 Albright, J.R., 301  
 Albrow, M.G., 355  
 Allaby, J.V., 257, 355  
 Allkofer, O.C., 319, 323, 340, 355  
 Almehed, S., 355  
 Alston, M., 28  
 Alston-Garnjost, M., 308  
 Amako, K., 328, 354  
 Amaldi, E., 315, 322  
 Amaldi, U., 257, 283, 355, 382  
 Amendolia, S.R., 232, 296, 301  
 Andersen, J.U., 76  
 Andersen, S.K., 73, 76  
 Anderson, D.F., 354  
 Ankenbrandt, C., 76, 383  
 Antreasyan, D., 308, 356  
 Areti, H., 176  
 Armstrong, T., 76, 308, 323  
 Arnison, G., 18, 381, 383  
 Artru, X., 300  
 Aschmann, D., 356  
 Ash, W., 76  
 Ashford, V., 323  
 Ashkin, J., 75  
 Astbury, A., 279, 283, 383  
 Astbury, J.P., 298, 301  
 Aston, D., 122, 308–9  
 Atac, M., 76, 268, 283, 383  
 Atkinson, M., 122  
 Atwood, W.B., 176, 299, 301  
 Aubert, B., 383  
 Aubert, J.J., 168, 176, 323, 355, 383  
 Babier, M., 123  
 Bacci, C., 383  
 Bagnaia, P., 203  
 Bahk, S., 300  
 Bailey, D., 300  
 Baker, R.D., 308  
 Baker, W.F., 91  
 Ball, A.H., 122  
 Ball, R.C., 132  
 Ballam, J., 300  
 Banford, A.P., 123  
 Bar-Yam, Z., 301  
 Baranger, H., 76  
 Barber, D.P., 345, 355  
 Barbiellini, G., 257, 355  
 Barish, B.C., 284, 322  
 Barklow, T., 76  
 Baroncelli, A., 257, 355  
 Barranco-Luque, M., 243  
 Bartl, W., 322  
 Bassompierre, G., 176, 323, 355  
 Batignani, G., 232, 301  
 Bauer, G., 383  
 Baum, G., 383  
 Beardsworth, E., 232  
 Becker, U., 237, 355, 383  
 Becks, K.H., 323, 355  
 Beer, A., 269, 279  
 Behrends, S., 216–7, 232  
 Beingessner, S.P., 232  
 Belau, E., 301  
 Bell, K.W., 76, 176

400 *Index*

- Bellini, G., 129–30, 132  
 Beloshitsky, V., 76  
 Benary, O., 355  
 Benda, H., 355  
 Beneventano, M., 322  
 Bengtson, B., 150, 155, 175–6  
 Benichou, J.L., 287, 300  
 Benot, M., 196, 203  
 Bensinger, J., 309, 323  
 Bequerel, H., 288  
 Beretvas, A., 322  
 Berg, D., 122  
 Berger, M.J., 39, 40, 75  
 Berglund, A., 308  
 Berglund, S., 169, 176  
 Bergstrom, M.R., 383  
 Berkelman, K., 76  
 Bertolucci, E., 232, 301  
 Bertsch, Y., 323, 355  
 Besset, D., 382  
 Besson, C., 323, 355  
 Best, C., 323, 355  
 Betev, B., 382  
 Bethe, H.A., 37, 48, 59, 75–6  
 Beusch, W., 323  
 Beuselinck, R., 76  
 Bevington, P., 390  
 Bezaguet, A., 383  
 Bharadwaj, V.K., 269  
 Biancastelli, R., 258  
 Biancastelliok, R., 355  
 Bichsel, H., 75  
 Biggs, P.J., 383  
 Binnie, D.M., 76, 301  
 Bird, L., 232  
 Birks, J., 175  
 Birsa, R., 322  
 Bishop, B.L., 284  
 Bjorken, J., 76  
 Blewett, J.P., 122  
 Blissett, J.A., 176  
 Blobel, V., 257, 355  
 Bloch, F., 37, 39  
 Blockus, D., 308  
 Bloodworth, I.J., 323  
 Bloom, E.D., 355–6  
 Bock, R., 383  
 Bodek, A., 322  
 Boerner, H., 76, 243–5, 257  
 Bogert, D., 279  
 Boggild, H., 86–7, 91, 355  
 Bohm, A., 355  
 Bohm, E., 323, 355  
 Bohr, N., 32  
 Boie, R.A., 233  
 Bollini, D., 284  
 Bologna, G., 232  
 Bolton, P.R., 383  
 Bonderup, E., 76  
 Bonneaud, G.R., 301  
 Boratav, M., 203, 300  
 Borenstein, S.R., 175  
 Borgia, B., 258, 322, 355  
 Bosio, C., 258, 355  
 Bosisio, L., 232, 301  
 Botner, O., 243, 355  
 Botterill, D.R., 323, 355  
 Bottigli, U., 232  
 Bourquin, M., 90, 314, 322, 365–6, 382  
 Bowcock, T.J., 383  
 Bowden, G.B., 301  
 Bowen, T., 76  
 Bowler, M.G., 76  
 Bradamante, F., 322  
 Bradaschia, C., 323, 301  
 Bradner, H., 76  
 Brandelik, R., 66, 76  
 Branson, J.G., 355  
 Brasse, F.W., 323, 355  
 Brau, J.E., 176  
 Braunschweig, W., 76  
 Bregman, M., 76  
 Breidenbach, M., 356  
 Breskin, A., 156, 200, 229, 232  
 Briggs, D., 283  
 Brock, I.C., 76  
 Broll, C., 257, 323, 355  
 Bromberg, C., 170, 308, 316–17, 323  
 Bron, J., 355  
 Brookes, G.R., 122  
 Brooks, F.D., 175  
 Brophy, J.J., 147  
 Brosco, G., 301  
 Brown, C., 284  
 Brown, J.S., 176  
 Brown, R.M., 76, 322, 382–3  
 Bucksbaum, P.H., 92, 122  
 Budinich, M., 232, 301  
 Buikman, D., 355  
 Bujak, A., 132  
 Bujanov, V.M., 203  
 Bulos, F., 356  
 Bunce, G.M., 9, 27, 132, 322, 382  
 Burckhart, D., 355  
 Burger, J., 383  
 Burger, J.D., 355  
 Burkert, V., 355  
 Burkhardt, H., 76, 193–5, 203  
 Burnett, T.H., 176, 356  
 Burns, A., 323  
 Burq, J., 75  
 Buskens, J., 232

*Index*

401

- Busser, F.W., 257, 355  
 Bussey, P.J., 122  
 Byckling, E., 393  
  
 Cake, B., 122  
 Caldwell, D., 123  
 Calligarich, E., 323  
 Calvetti, M., 383  
 Campbell, A.J., 76  
 Capell, M., 237  
 Capone, A., 258, 322, 355  
 Cardello, T., 300  
 Carithers, W., 283  
 Carlson, P.J., 176  
 Carnegie, R., 76  
 Carosi, R., 269  
 Carr, J., 323, 355  
 Carroll, A.S., 82, 91  
 Carroll, T., 383  
 Cashmore, R.J., 76  
 Cassel, D., 257  
 Castelli, E., 203  
 Castoldi, C., 132  
 Catz, P., 383  
 Cavaglia, P., 147, 176  
 Cavalli-Sforza, M., 356  
 Cecchet, G., 323  
 Cennini, P., 383  
 Centro, S., 383  
 Ceradini, F., 383  
 Cerenkov, P., 178  
 Chandlee, C., 122  
 Chang, C.C., 355  
 Chapman, J., 193, 243  
 Charles, B., 323, 355  
 Charpak, G., 76, 218, 223–4, 231–2, 250,  
 257, 292, 300, 354  
 Charveys, A., 257  
 Chase, R.L., 147  
 Checchia, P., 203  
 Chemarin, M., 75  
 Chen, H.S., 355  
 Chen, M., 355, 383  
 Cheng, C.P., 355  
 Chernyatin, V., 301  
 Chestnut, R., 356  
 Chevallier, M., 75  
 Chew, D.M., 382  
 Chiang, I.-H., 91  
 Childress, S., 132  
 Chinowsky, W., 283  
 Chollet, J.C., 322, 382  
 Chu, Y.S., 355  
 Chung, S.U., 301, 308  
 Cihangir, S., 122  
 Citron, A., 369, 382  
  
 Cittolin, S., 383  
 Clare, R., 355  
 Clark, A.R., 323  
 Clarke, D., 122  
 Clarke, P.E., 76  
 Clendenin, J.E., 383  
 Clift, R.W., 323, 355  
 Cline, D., 91, 383  
 Cobb, J.H., 270, 283, 295, 300, 316, 323,  
 355  
 Cocconi, G., 257, 355  
 Cochet, C., 383  
 Cockerill, D., 355  
 Coffin, C.T., 132  
 Coignet, G., 176, 323, 355  
 Colas, J., 383  
 Cole, F.T., 122  
 Coleman, R.N., 322  
 Collick, B., 122  
 Colyer, B., 126  
 Combley, F., 323, 355, 382  
 Commins, E.D., 92, 122  
 Conetti, S., 176, 300  
 Conforto, G., 132  
 Connell, K., 122  
 Conversi, M., 301  
 Cook, V., 176  
 Cool, R.L., 176  
 Cooper, S., 76, 283  
 Corden, M., 383  
 Cormell, L., 284  
 Coutrakon, G., 193  
 Cox, B., 176  
 Cox, P.T., 314, 322, 382  
 Coyne, D., 356  
 Crabb, D.G., 158, 176  
 Crandall, E., 284  
 Crespo, J.M., 176, 323, 355  
 Crisler, M.B., 132  
 Crittenden, R.R., 221–2, 232  
 Crowley-Milling, M., 95, 100, 122  
 Cutts, D., 309  
  
 Dagan, S., 355  
 D'Agostini, G., 155, 159, 174, 176  
 Dahl-Jensen, E., 355  
 Dahl-Jensen, I., 355  
 Dake, S., 283  
 Dallman, D., 383  
 Dalpiaz, P., 323, 355  
 Dalpiaz, P.F., 323, 355  
 Dam, Ph., 355  
 Damgaard, G., 355  
 D'Angelo, P.D., 132  
 Darriulat, P., 91, 336, 355, 382  
 Dau, W.D., 323, 355

402 *Index*

- Daum, C., 249, 258, 308  
 Daum, M., 359, 382  
 Davidenko, V.A., 232  
 Davies, J.K., 323, 355  
 Davies-White, W., 243  
 Davis, P., 300  
 Dean, A.J., 158, 176  
 Dearnalloy, G., 301  
 DeBeer, M., 383  
 deBoer, W., 243  
 DeBotton, N.R., 383  
 Deck, L., 322  
 Declais, Y., 176, 193, 257, 323, 355  
 DeGraaf, E.J., 232  
 Degre, A., 322, 382  
 Del Papa, C., 176  
 Delavallade, G., 323  
 Dell, G.F., 323  
 Della Negra, M., 322, 383  
 Delzenero, R., 323  
 Demoulin, M., 383  
 Denegri, D., 383  
 Denisov, A., 75  
 DeNotaristefani, F., 258, 322, 355  
 Deutschmann, M., 296, 301  
 Devenish, R., 76  
 Devensky, P., 132  
 Devlin, T., 322, 382  
 Devoe, R., 283  
 Dhawan, S.K., 300, 383  
 Diamond, R.N., 301  
 DiBitonto, D., 383  
 DiCiaccio, A., 383  
 Diddens, A.N., 246, 248, 257, 340, 355  
 Dionisi, C., 203  
 Disco, A., 300  
 Dittmann, P., 382  
 Dobinson, R.W., 147, 323, 353, 355–6  
 Dobrzynski, L., 383  
 Dolfini, R., 323  
 Dolgoshein, B.A., 232, 301  
 Dombeck, T., 300  
 Donaldson, G., 284, 308, 322  
 Doohar, J., 323  
 Dore, U., 332  
 Dornan, P.J., 76  
 Dowd, J., 301  
 Dowell, J.D., 383  
 Drees, J., 122, 323, 355  
 Drell, S., 76  
 Drescher, A., 269  
 Drijard, D., 310, 322  
 Duane, A.D., 301  
 Duboc, J., 203  
 Duchovni, E., 76  
 Duclos, J., 203  
 Duerdoth, I.P., 122  
 Duffy, M.E., 132  
 Duinker, P., 91, 355  
 Dukes, C., 322  
 Duncan, A.L., 176  
 Dworkin, J., 322, 382  
 Dykes, M., 288, 300  
 Dzierba, A., 323  
 Earty, D.P., 91  
 Eaton, G.H., 382  
 Eckardt, V., 153, 175, 382  
 Ecklund, S., 76, 383  
 Edelman, B., 382  
 Edwards, A., 323, 355  
 Edwards, K.W., 354  
 Edwards, M., 323, 355, 383  
 Edwards, R.T., 382  
 Egawa, K., 309  
 Eggert, K., 368, 382–3  
 Ehrlich, R., 283  
 Eickmeyer, J., 62–3, 76  
 Eiseman, S., 257  
 Eisenberg, Y., 76  
 Eisenhandler, E., 383  
 Eisenstein, B., 284  
 Ekelof, T., 75  
 Ellis, N., 383  
 Ellison, R.J., 122  
 Ely, R.P., 282, 382  
 Ems, S.C., 221–2, 232  
 Endo, I., 232  
 Erhan, S., 323  
 Erhard, P., 383  
 Errede, S., 300  
 Etkin, A., 200, 257, 323  
 Evans, W.M., 355  
 Everhart, G., 383  
 Fabjan, C.W., 27, 265, 267, 276, 280–1,  
 283–4, 296, 300–1, 323, 336, 355  
 Fackler, O., 91  
 Faissner, H., 383  
 Fajardo, L.A., 76, 383  
 Fancher, D., 258  
 Fang, G.Y., 355  
 Fano, U., 75  
 Fanourakis, G.K., 132  
 Farley, F.J., 382  
 Farr, W., 243  
 Favier, J., 257, 323, 355  
 Fazzini, T., 382  
 Fenker, H., 301  
 Ferbel, T., 86–7, 91, 122, 322, 355  
 Fermi, E., 40, 75  
 Fernow, R.C., 122, 128, 301, 383  
 Ferrari, E., 122  
 Ferrero, M.I., 323, 355

*Index*

403

- Ferroni, F., 258, 323, 355  
 Fesefeldt, H., 355  
 Fich, O., 76  
 Fidecaro, F., 232, 301  
 Fidecaro, G., 305–7, 318, 322, 382  
 Fidecaro, M., 322  
 Field, J.H., 323, 355  
 Fields, T.H., 28  
 Fischer, H.G., 27, 322  
 Fischer, H.M., 76, 257  
 Fischer, J., 41, 45, 75, 232, 300  
 Fisher, C.M., 300  
 Fisjak, Y.V., 203  
 Fisk, H.E., 89, 90, 92, 106, 122, 322  
 Flauger, W., 323, 355  
 Flegel, W., 257, 355  
 Flynn, P.J., 122  
 Foa, L., 232, 301  
 Focardi, E., 301  
 Fohrmann, R., 76, 203, 257  
 Foley, K.J., 257, 300, 323  
 Fong, D., 355  
 Fontaine, G., 322, 383  
 Foster, B., 76, 176  
 Fowler, P., 300  
 Fox, G., 323  
 Frabetti, P.L., 284  
 Franck, J.V., 28  
 Franco, V., 132  
 Frandsen, P., 355  
 Frank, I., 180  
 Frank, J.S., 382  
 Fransson, K., 175  
 Franzke, J., 76, 203  
 Freedman, S.J., 382  
 Freeman, J., 203  
 Frehse, H., 322  
 Frenzel, H., 382  
 Frey, R., 383  
 Friedberg, C., 283  
 Fries, R., 382  
 Froidevaux, D., 322, 382  
 Frosch, R., 382  
 Fruhwirth, R., 322, 383  
 Fry, W.F., 91  
 Fuchi, H., 300  
 Fujii, K., 308  
 Fujioka, G., 300  
 Fukushima, H., 300  
 Fukushima, M., 355  
 Fukushima, Y., 322  
  
 Gabathuler, E., 323, 355  
 Gabriel, T.A., 275, 284  
 Gaillard, J.-M., 322, 382  
 Gaiser, J., 356  
 Galbraith, W., 122, 188, 203, 382  
  
 Gall, P.D., 257, 355  
 Gallivan, J., 301  
 Gamet, R., 323, 355  
 Garbutt, D.A., 76  
 Garvey, J., 383  
 Garwin, R.L., 176  
 Gasparini, F., 322  
 Gather, K., 76  
 Gavrilenko, I., 301  
 Gayler, J., 323, 355  
 Gearhart, R.A., 176  
 Gebauer, H.J., 382  
 Gee, C.N., 322, 382  
 Geer, S., 383  
 Geist, W., 322  
 Gemanov, V., 257, 355  
 Gentile, T., 76  
 Gerber, J.-P., 322, 382  
 Ghesquiere, C., 322, 382–3  
 Ghez, P., 323, 355, 383  
 Giacomelli, G., 80–1, 84, 91, 382  
 Giazotto, A., 232, 301  
 Giboni, K.L., 382–3  
 Gibson, M.D., 355  
 Gibson, W.M., 322, 382  
 Gibson, W.R., 383  
 Gimm, H.A., 55, 63  
 Giorgi, M., 322  
 Giorgi, M.A., 232, 301  
 Giraud-Heraud, Y., 383  
 Givernaud, A., 383  
 Givoletti, M., 301  
 Glauber, R.J., 132  
 Gluckstern, R.L., 326, 354  
 Gobbi, B., 382  
 Godfrey, G., 356  
 Gokieli, R., 322  
 Gold, M., 283  
 Goldberg, H., 323  
 Goldberger, J., 284  
 Goldhagen, P., 383  
 Goldman, J.H., 301, 323  
 Gollin, G.D., 315, 323  
 Gollon, P.J., 76, 383  
 Gomez, R., 323  
 Gonidec, A., 383  
 Goodman, M.S., 284  
 Gordon, B.A., 308  
 Gordon, H.A., 193, 279, 284, 346, 355  
 Gorn, W., 258  
 Gossling, C., 323, 355  
 Gottfried, Ch., 322  
 Gottschalk, B., 147  
 Goulios, K., 176  
 Grafstrom, P., 75  
 Grannis, P., 284  
 Grassmann, H., 84, 150

404 *Index*

- Grayer, G., 383  
 Grigoriev, E., 257, 355  
 Grobel, R., 322  
 Grossmann, P., 76  
 Grote, H., 28, 257, 355  
 Gu, Y.-F., 356  
 Guo, J.C., 355  
 Guo, Y.-N., 383  
 Guryn, W., 382  
 Gusewell, D., 300  
 Gustafson, H.R., 82, 91, 132  
 Gutierrez, P., 383  
 Gutzwiller, M., 300  
  
 Haas, J., 323, 355  
 Hagberg, E., 75  
 Hagedorn, R., 27  
 Haggerty, H., 323  
 Hagopian, S., 301  
 Hagopian, V., 301  
 Haguenaer, M., 232  
 Hahn, B., 300  
 Hahn, U., 323, 355  
 Hale, G., 176  
 Hallgren, A., 355  
 Hamacher, K., 323, 355  
 Hamada, T., 128  
 Hammarstrom, R., 227, 232  
 Hampson, P.G., 122  
 Handler, R., 322, 382  
 Hanke, P., 322  
 Hansen, K.H., 355  
 Hansl-Kozanecka, T., 383  
 Hanson, A.O., 76  
 Hara, T., 300  
 Hariri, A., 355  
 Harnew, N., 193  
 Harnois, J., 300  
 Harris, F.A., 382  
 Harris, M., 283, 323, 355  
 Harsh, V.-R., 383  
 Hart, J.C., 28, 76, 176  
 Hartill, D., 76  
 Hartmann, H., 76, 257  
 Harvey, J., 76  
 Haselden, G., 126  
 Hasinoff, M., 175  
 Haxton, W.C., 356  
 Hayakawa, S., 123  
 Hayman, P., 323, 355  
 Haynes, W.J., 383  
 Heath, R., 175  
 Hebert, C., 300  
 Hebert, J., 300  
 Heck, B., 355  
 Heiden, M., 322  
 Heiman, G., 284  
  
 Heine, P., 257, 355  
 Heinz, R.M., 221–2, 232  
 Heitler, W., 48, 59, 75, 261, 283  
 Heller, K., 322, 382  
 Heller, R., 203  
 Henckes, M., 323, 355  
 Heppelman, S., 122  
 Hertzen, G., 355  
 Hertzberger, L.O., 258, 383  
 Herve, A., 300  
 Heyland, D., 76  
 Hiddleston, J., 355  
 Hieber, R.H., 354  
 Highland, V., 69, 76  
 Hilger, E., 76  
 Hilke, H.J., 258  
 Hilke, J.H., 355  
 Hillen, W., 76  
 Hinterberger, H., 176  
 Hirschmann, H., 382  
 Hitlin, D., 271, 283  
 Ho, M.C., 355  
 Hodges, C., 383  
 Hoffman, C.M., 356, 382  
 Hoffmann, D., 383  
 Hoffmann, H., 355, 383  
 Hofmann, W., 322  
 Hofstadter, R., 175, 356  
 Hoftun, J.S., 132  
 Hogan, G.E., 320–1, 323  
 Hogue, R., 355  
 Holcomb, L., 284  
 Holder, M., 76, 382  
 Holloway, L.E., 284  
 Holmes, C., 175  
 Holthuizen, D.J., 383  
 Homer, R.J., 383  
 Homma, Y., 300  
 Honma, A., 383  
 Hoogland, W., 258  
 Hooper, J., 355  
 Hoshino, K., 300  
 Hotta, N., 283  
 Hsu, H.K., 355  
 Hubbell, J.H., 55, 63, 76, 149  
 Hugentobler, E., 300  
 Hughes, E., 175  
 Hughes, V.W., 383  
 Hughes-Jones, R.E., 122  
 Hultschig, H., 76  
 Huston, J., 122  
 Hyams, B., 297, 301  
  
 Ibbotson, M., 122  
 Ibold, N., 203  
 Igo-Kemenes, P., 322, 382  
 Ille, B., 75

*Index*

405

- Illingworth, J., 76  
 Imanishi, A., 255, 258  
 Innocenti, P.G., 322  
 Ishii, T., 258  
 Ito, H., 283  
 Iwata, S., 232, 283, 300, 323  
  
 Jackson, J.D., 75, 122  
 Jacobson, J., 176  
 Jafar, J.D., 301  
 James, G., 123  
 Janes, G., 132  
 Jank, W., 383  
 Jarlskog, G., 355  
 Jean-Marie, B., 213, 236, 240, 257  
 Jeffreys, P.W., 322, 355, 382  
 Jelley, J.V., 188, 203  
 Jenkins, C.M., 301, 308  
 Jenkins, E., 132  
 Jensen, T., 123  
 Johansson, K.E., 300  
 Johnson, K.J., 323  
 Johnson, R.A., 153–4  
 Johnson, R.P., 323  
 Johnston, I., 128  
 Jokisch, H., 323, 355  
 Jonckheere, A.M., 91, 112  
 Jones, L.W., 82, 91, 132  
 Jones, T.D., 76  
 Jones, W.G., 76  
 Jones, W.V., 76  
 Jongerius, R.T., 258  
 Jonker, M., 257, 279, 355  
 Joos, P., 76  
 Jorat, G., 383  
 Jost, B., 382  
 Juhala, R., 323  
 Jung, M., 322, 382  
 Jursa, A.S., 156  
  
 Kadel, R.W., 355  
 Kadyk, J., 283, 323, 355  
 Kaftanov, V., 257, 355  
 Kalbach, R., 175  
 Kallen, G., 359, 382  
 Kalmus, P.I., 383  
 Kanjantie, K., 393  
 Kantardjian, G., 323, 355  
 Kantserov, V., 301  
 Karimaki, V., 383  
 Karliner, I., 382  
 Karshon, U., 76  
 Kasahara, K., 283  
 Kaschuk, A., 75  
 Kaspar, H., 203  
 Kawamoto, T., 232  
 Kawano, K., 354  
  
 Keeler, R., 383  
 Keil, G., 157, 176  
 Kellog, R., 300  
 Kemmer, J., 301  
 Kemp, M.A., 122  
 Kenyon, I., 383  
 Kephart, R.D., 284, 308  
 Kern, W., 301  
 Kernan, A., 383  
 Kerth, L.T., 28, 323  
 Kessler, G., 355  
 Kettle, P.-R., 382  
 Kholodenko, A.G., 203  
 Khovansky, V., 257, 355  
 Kiesling, C., 356  
 Killian, T., 355  
 Kim, C., 300  
 Kim, S., 283  
 Kimura, H., 300  
 Kinnunen, R., 383  
 Kirk, H., 301  
 Kirkbride, I., 356  
 Kirsch, L., 301  
 Kirschnik, F.J., 76  
 Kirsten, F.A., 356  
 Kistenev, E.P., 203  
 Klanner, R., 301  
 Klawonn, F., 153, 175  
 Klein, O., 57  
 Kleinknecht, K., 28, 175  
 Klem, D.E., 301  
 Klimanova, M., 203  
 Kluge, E.E., 322  
 Knapik, J., 258  
 Knop, G., 76  
 Koch, W., 76  
 Koehler, P.F., 91, 203  
 Koene, B., 232  
 Koetz, U., 301  
 Kohaupt, R.D., 100, 122  
 Kolanoski, H., 76, 356  
 Kolb, E.W., 356  
 Kollmann, W., 356  
 Komarov, F., 76  
 Kondo, K., 383  
 Kondo, T., 300  
 Konigsmann, K., 356  
 Kopke, L., 76  
 Korbel, V., 323, 355  
 Korenchenko, S., 395  
 Korff, S., 231  
 Kotz, U., 76, 257  
 Kourkoumelis, C., 283–4, 300, 308, 323  
 Kowalski, H., 76, 257, 383  
 Kozanecki, W., 257, 355, 383  
 Kramer, M.A., 257, 323  
 Krasemann, H.L., 76, 203

406 *Index*

- Krenz, W., 355  
 Krider, J.C., 221–2, 232  
 Krisch, A.D., 122, 354, 383  
 Kristensen, P., 232  
 Kroger, B., 257, 355  
 Kropac, W., 323  
 Kryn, D., 383  
 Kulikov, A., 75  
 Kunz, P.F., 356  
 Kuramata, S., 300  
 Kusumoto, O., 300  
 Kuti, J., 383  
 Kuznetsov, A., 91, 382  
 Kycia, T.F., 91, 382
- Lacava, F., 383  
 Lach, J., 76, 123, 383  
 Ladage, A., 76  
 Lafferty, G.D., 122  
 Lambert, M., 75  
 Lamsa, D.W., 322  
 Lanceri, L., 322  
 Landau, L., 43–4  
 Lane, J.B., 122  
 Lankford, A.J., 283–4, 300, 323  
 Lans, J. v.d., 355  
 Lanzl, L.H., 76  
 Laugier, J.-P., 383  
 Laurenti, G., 284  
 Layter, J., 258  
 Learned, J., 76  
 Lebeau, M., 257  
 LeBlanc, F.J., 156  
 Lebrun, P., 176  
 Lecomte, P., 203  
 Lecoq, P., 300  
 Leder, G., 322  
 Lee, Y.Y., 383  
 Lees, J.-P., 383  
 Legros, M., 382  
 Lehmann, H., 383  
 Lehraus, I., 254, 258  
 Leong, J., 383  
 Leontic, B.A., 382  
 Lepeltier, V., 213, 236, 240, 257  
 Letheren, M.F., 301  
 Leu, P., 76  
 Leuchs, K., 383  
 Leutz, H., 300  
 Leveque, A., 383  
 Levi, M., 76  
 Levine, M.J., 232  
 L'Hote, D., 213, 236, 240, 257  
 Li, J., 355  
 Li, K.K., 91  
 Li, Q.Z., 355  
 Liberman, A., 356
- Lichtenstein, C., 76  
 Liello, F., 232  
 Liguori, G., 323  
 Lindenbaum, S.J., 257, 300, 323  
 Lindsay, J., 283, 323, 355  
 Ling, T.Y., 132  
 Linglin, D., 322, 383  
 Linssen, L., 232  
 Lissauer, D., 355  
 Litke, A.M., 382  
 Litt, J., 122, 184, 196, 198–9, 203  
 Littauer, R., 76  
 Livingston, M.S., 122  
 Lloyd, S.L., 76  
 Lobkowitz, F., 123  
 Locci, E., 383  
 Lockman, W., 356  
 Lohr, B., 76, 257  
 Lohrmann, E., 76  
 Lokanathan, S., 300  
 Loken, S.C., 258, 323  
 Lomanno, F., 309  
 Longacre, R.S., 257  
 Longo, E., 257, 323, 355  
 Longo, M.J., 82, 91, 132  
 Lorenz, E., 84, 150, 323  
 Lorenzi, R., 232  
 Loret, M., 383  
 Lorstad, B., 355  
 LoSecco, J.M., 350  
 Love, W.A., 257, 300, 323  
 Loveless, R.J., 132  
 Lu, M., 355  
 Lubatti, H.J., 355  
 Lubell, M.S., 383  
 Lubelsmeyer, K., 76  
 Luckey, D., 355  
 Ludlam, T., 265, 267, 276, 280, 283,  
 296–7, 300–1, 336, 355  
 Luk, K.B., 322  
 Luke, D., 76  
 Luminari, L., 323  
 Lundberg, B., 322  
 Lupiltsev, V.P., 203  
 Lutz, G., 301  
 Lyman, E.M., 76  
 Lynch, H.L., 76
- Ma, C.M., 355  
 Ma, D.A., 355  
 Maccabee, H., 75  
 Macdonald, J., 258  
 MacLachlan, J., 76, 383  
 Madaras, R., 258  
 Maeda, Y., 300  
 Mael, D., 76  
 Maiburov, S., 301



- Maire, M., 323, 355  
 Majerotto, W., 322  
 Majewski, S., 232, 354  
 Majka, R., 76, 300, 383  
 Makdisi, Y., 122  
 Maki, A., 308  
 Malamud, E., 132, 323  
 Malosse, J.-J., 383  
 Mandelli, L., 323  
 Manfredi, P.F., 132  
 Mannelli, I., 283, 323  
 Manz, A., 175  
 Mao, Z.-L., 383  
 March, R., 382  
 Margulies, S., 323  
 Marini, A., 382  
 Marini, G., 176  
 Markiewicz, T.W., 323, 383  
 Marrocchesi, P.S., 232, 301  
 Marsh, D., 283  
 Marsh, W., 322  
 Marshak, M., 122, 282, 284  
 Martellotti, G., 176  
 Martin, J., 300  
 Martin, J.F., 283  
 Martin, J.P., 75  
 Martin, P., 258, 382  
 Martyn, H.-U., 76  
 Marx, J.N., 76, 258, 383  
 Marx, M.D., 91  
 Maschuw, R., 203  
 Massa, F., 176  
 Massaro, G.G., 355  
 Massonnet, L., 176, 323, 355  
 Matsuda, T., 258, 355  
 Matsui, T., 354  
 Matthewson, R., 254, 258  
 Matthiae, G., 232  
 Mattig, P., 76  
 Maurin, G., 383  
 Maury, S., 75  
 Mazur, P.O., 91, 176  
 Mazzanti, M., 323  
 Mazzucato, M., 203  
 McCarriston, T., 383  
 McCubbin, N.A., 355  
 McCulloch, J., 382  
 McDonald, K.T., 382  
 McEwen, J.G., 158, 176, 301  
 McLaughlin, M., 123  
 McLeod, B., 300  
 McLeod, D., 323  
 McMahan, T., 383  
 Meadows, B.T., 301  
 Medinnis, M., 323  
 Meinke, R., 382  
 Melchart, G., 232  
 Melin, A., 355  
 Melissinos, A.C., 147, 175, 216–17, 232,  
 323, 355, 390  
 Mendiburu, J.-P., 383  
 Meneguzzo, A., 322  
 Mennessier, G., 300  
 Menzione, A., 232, 301  
 Mercer, D., 122  
 Merkel, B., 322, 382  
 Meroni, E., 132  
 Merritt, F.S., 322  
 Mess, K.H., 76, 257, 355  
 Messner, R.L., 322  
 Metcalf, M., 257, 355  
 Meunier, R., 184, 196, 198–9, 203  
 Meyer, D.I., 193  
 Meyer, J., 257, 355  
 Meyer, T., 76, 203  
 Meyer, W.T., 322  
 Meyers, P.D., 323  
 Michalowski, S., 76  
 Michelini, A., 232  
 Mikenberg, G., 76  
 Miller, D.G., 301  
 Miller, D.H., 382  
 Miller, R.H., 383  
 Mills, F.E., 122  
 Minard, M.-N., 383  
 Minehart, R.C., 382  
 Mischke, R.E., 382  
 Mishina, M., 283  
 Mistry, N., 76  
 Miyajima, M., 132  
 Miyanishi, M., 283, 300  
 Miyashita, S., 383  
 Mizuno, Y., 232  
 Mizutani, K., 283  
 Mjornmark, U., 355  
 Mockett, P.M., 176  
 Modis, T., 382  
 Mohr, W., 323, 355  
 Moir, D.C., 382  
 Moliere, G., 69, 76  
 Moller, R., 355  
 Molzon, W.R., 322, 355  
 Monacelli, P., 258, 355  
 Monari, L., 284  
 Moneti, G., 300  
 Montague, B.W., 382  
 Montgomery, H.E., 122, 323, 355  
 Moore, C., 323  
 Morand, R., 322, 382  
 Morehouse, C.C., 283  
 Mori, S., 323  
 Moricca, M., 383  
 Morimoto, K., 383  
 Moriyama, K., 300

408 *Index*

- Moroni, L., 132  
 Morozov, A.G., 395  
 Morozov, B., 132  
 Morris, G.R., 284  
 Morris, T.W., 257, 323  
 Morris, W., 301  
 Morse, R., 283  
 Moser, H.-G., 84, 150  
 Moser, K., 323, 355  
 Moser, U.F., 383  
 Moszynski, M., 150, 155, 175–6  
 Mount, R.P., 147, 168, 176, 323, 355  
 Moynot, M., 176, 257, 323, 355  
 Mugge, M., 323  
 Muirhead, H., 383  
 Muller, D., 263, 283  
 Muller, F., 383  
 Munakata, H., 283
- Naito, F., 258  
 Nakada, T., 322  
 Nakamura, K., 283, 323  
 Nakano, I., 383  
 Nandi, A.K., 383  
 Napolitano, J., 382  
 Nappi, A., 283, 300, 323  
 Naumann, L., 383  
 Navach, F., 323  
 Navarria, F.L., 284  
 Nekrasov, K.G., 395  
 Nelson, C., 112  
 Nemethy, P., 76, 201, 203, 300, 383  
 Neugebauer, E., 301  
 Neuhofer, G., 322  
 Nevski, P., 301  
 Newman, C., 356  
 Newman, H., 355  
 Newton, D., 122  
 Niebergall, F., 257, 355  
 Nielsen, B.S., 355  
 Nielsen, H., 76  
 Nielsen, S.O., 355  
 Neito, M.M., 356  
 Nikitin, V., 132  
 Nilsson, A., 355  
 Nishima, Y., 57  
 Nitz, D., 243  
 Niu, K., 300  
 Niwa, K., 300  
 Noguchi, Y., 300  
 Nomokonov, P., 132  
 Northrop, D., 301  
 Norton, A., 322, 383  
 Norton, P.R., 323, 355  
 Notz, D., 76  
 Nurushev, S., 322  
 Nygren, D.R., 258
- Oddone, P., 258  
 Ogawa, A., 301  
 Ogg, M., 76  
 Ohshima, T., 258  
 Ohsugi, T., 232  
 Ohta, I., 283  
 Okabe, H., 300  
 Okuno, H., 41, 45, 75, 232, 258  
 Olivier, P., 300  
 Olsen, L.H., 355  
 Olsen, S., 322  
 O'Neill, L., 308  
 Oppenheim, R.F., 383  
 Oreglia, M., 347–8, 356  
 O'Reilly, J., 356  
 Oren, Y., 355  
 Orkin-Lecourtois, A., 383  
 Orr, R.S., 257, 355  
 Osborne, A.M., 323, 355  
 Osborne, D., 237  
 Oshima, T., 123  
 Ott, R.J., 158, 176  
 Overbo, I., 55, 63  
 Overseth, O.E., 322, 382  
 Owen, D.P., 301  
 Ozaki, S., 257, 300, 323
- Paans, A.M., 232  
 Palano, A., 323  
 Palazzi-Cerrina, C., 132  
 Palladino, V., 237, 257  
 Palmer, D.A., 383  
 Palmer, R.B., 175, 283, 301  
 Panda, L., 383  
 Pandoulas, D., 76  
 Panman, J., 257, 355  
 Panofsky, W.K., 354  
 Pantell, R.H., 76  
 Panter, M., 322  
 Paoluzi, L., 383  
 Papworth, D., 75  
 Parham, A.G., 176  
 Park, J., 300  
 Parker, M.J., 382  
 Parker, S., 382  
 Partridge, R., 356  
 Parvulescu, A., 76  
 Pasierb, E., 308  
 Passardi, G., 300  
 Passeneau, J., 203  
 Passuello, D., 301  
 Pavlopoulos, P., 150, 175  
 Payne, B.T., 176  
 Payre, P., 176, 323, 355  
 Peck, C.W., 355–6  
 Peise, G., 76  
 Peisert, A., 236, 239, 257

*Index*

409

- Pellegrini, C., 122  
 Penzo, A., 322  
 Perini, L., 323  
 Perkins, D.H., 27, 300, 356, 382  
 Perl, M.L., 91  
 Pernicka, M., 322  
 Peroni, C., 176, 323, 355  
 Perrot, G., 257  
 Persico, E., 122  
 Peruzzi, I., 382  
 Pessard, H., 323, 355  
 Pestov, Y.N., 301  
 Petersen, G., 76, 232  
 Peterson, E., 122  
 Petrucci, G., 383  
 Phillips, R.H., 382  
 Piano Mortari, G., 383  
 Picasso, E., 382  
 Picciarelli, V., 323  
 Piccolo, M., 382  
 Piemontese, L., 322  
 Pietrzyk, U., 323, 355  
 Pifer, A., 76  
 Pilipenko, Y., 132  
 Pimia, M., 383  
 Pine, J., 323  
 Pistilli, P., 258, 323, 355  
 Pitman, D., 300  
 Pitthan, R., 301  
 Pizer, I., 318, 323  
 Placci, A., 383  
 Platner, E.D., 242, 257, 300–1, 323  
 Plothow–Besch, H., 322, 382  
 Poelz, G., 76, 203  
 Pohl, M., 355  
 Polakos, P., 76  
 Policarpo, A.J., 175  
 Poling, R., 283  
 Poljakov, B., 203  
 Pollmann, D., 175  
 Pollock, B., 356  
 Polychronakos, V.A., 257, 301  
 Pondrom, L.G., 9, 27, 123, 322, 382  
 Ponpon, J., 76  
 Pons, Y., 323  
 Pope, B., 334  
 Porter, F.C., 356  
 Poschmann, F.P., 355  
 Posocco, M., 322  
 Poster, R., 301  
 Pothier, J., 300  
 Poucher, J., 283  
 Powell, B., 202–3  
 Powell, C., 300  
 Poyer, Ch., 322  
 Prentice, J.D., 300  
 Pretzl, K.P., 175  
 Prince, T.A., 283  
 Procario, M., 283  
 Protopopescu, S.D., 301  
 Proudfoot, J., 76, 176  
 Pugh, H.G., 382  
 Pun, T.P., 382  
 Putzer, A., 322  
 Pyrlík, J., 76  
 Quaglia, M., 232, 301  
 Quarrie, D.R., 76  
 Querrou, M., 75  
 Queru, P., 355  
 Radeka, V., 232–3  
 Radermacher, E., 383  
 Ragusa, F., 132  
 Rahm, D.C., 91, 224, 232, 283, 323  
 Raine, C., 122  
 Raith, W., 383  
 Rambaldi, A., 176  
 Rameika, R., 322  
 Ramseyer, E., 300  
 Rancoita, R., 301  
 Ranitzsch, K.H., 257, 355  
 Ransdell, J., 383  
 Ratner, L.G., 354  
 Rauschnable, K., 322  
 Reay, N.W., 300  
 Reeder, D.D., 132  
 Regler, M., 322  
 Rehak, P., 232–3, 283–4, 301, 323  
 Reibel, K., 300  
 Reichardt, J., 203  
 Reines, F., 350  
 Reithler, H., 383  
 Renton, P., 92  
 Repellin, J.-P., 322, 382  
 Repond, J., 175  
 Revel, D., 76  
 Revol, J.-P., 355, 383  
 Rewiersma, P., 232  
 Rhoades, T.G., 383  
 Rice–Evans, P., 209, 214, 231, 257, 300  
 Rich, J., 383  
 Richardson, M., 356  
 Riester, J.-L., 322, 382  
 Riethmuller, R., 76, 203  
 Rijssenbeek, M., 383  
 Rimkus, J., 76  
 Rindi, A., 121, 123  
 Ringel, J., 203  
 Ristori, L., 232, 301  
 Ritchie, J.L., 312, 322  
 Rith, K., 323, 355  
 Ritson, D., 123, 132, 150, 176  
 Roberts, A., 76, 383

410 *Index*

- Roberts, C., 383  
 Roberts, J.H., 122  
 Roberts, T.J., 82, 91, 132  
 Roberts, T.R., 126  
 Robertson, A.W., 308  
 Robrish, P., 258  
 Roe, B.P., 132  
 Rohde, M., 355, 383  
 Rohlf, J., 323, 383  
 Roiron, G., 232  
 Rolandi, L., 232, 301  
 Romanowski, T.A., 132, 300  
 Romer, O., 76, 203  
 Ronat, E., 76  
 Ronga, F., 382  
 Rosanov, A., 258, 355  
 Ross, M.C., 382  
 Rosselet, L., 76, 355, 383  
 Rossi, B., 75, 132, 264, 283  
 Rossi, P., 203, 383  
 Rosso, E., 355  
 Rousseau, M.D., 175, 323, 355  
 Rousset, A., 382  
 Rowson, P., 283  
 Royer, H., 300  
 Royse, J., 382  
 Royse, W., 382  
 Rubbia, C., 379, 383  
 Rubin, D., 243  
 Rubinstein, R., 91  
 Ruddick, K., 122, 354  
 Rudge, A., 355  
 Rudolph, G., 76  
 Runolfson, O., 232  
 Rusch, R., 203  
 Ruzicka, J., 203  
 Ryan, T., 176  
 Rykaczewski, H., 355  
  
 Sadoulet, B., 237, 257, 383  
 Sadowski, E.S., 284  
 Sadrozinski, H., 356  
 Sajot, G., 322, 383  
 Sakata, M., 283  
 Sala, S., 132  
 Salmon, G.L., 76  
 Salvadori, P., 301  
 Salvi, G., 383  
 Salvini, G., 383  
 Samios, N.P., 4  
 Sandberg, V.D., 356  
 Sander, H.G., 76  
 Sander, O.R., 382  
 Sandweiss, J., 76, 122, 300, 383  
 Sanford, J.R., 122  
 Santoni, C., 258, 355  
 Sasao, N., 383  
  
 Sass, J., 383  
 Saudraix, J., 383  
 Sauli, F., 76, 209, 231–2, 236, 239,  
 250–1, 257–8  
 Saulys, A.C., 257, 300, 323  
 Saunders, B.J., 322, 382  
 Sauvage, G., 322, 382  
 Savoy-Navarro, A., 383  
 Saxon, D.H., 28, 76, 176  
 Saxon, R., 75  
 Schaad, T., 283  
 Schachinger, L., 363–4, 382  
 Schamberger, R.D., 308  
 Schardt, M.A., 366, 382  
 Scharre, D.L., 308, 356  
 Schegelsky, V., 75  
 Schiavon, P., 322  
 Schiby, B., 322, 382  
 Schindler, R.H., 355  
 Schinzel, D., 383  
 Schiott, H., 76  
 Schistad, B., 355  
 Schiz, A., 76, 371–2, 383  
 Schlein, P., 323  
 Schlosser, E., 323, 355  
 Schmidt, P., 301  
 Schmidt, W., 275  
 Schmidt-Parzefall, W., 257, 283  
 Schmitz, D., 76  
 Schmitz, N., 175  
 Schmuser, P., 76, 203, 257, 282, 284  
 Schneegans, M.A., 176, 323, 355  
 Schneider, F., 257, 355  
 Schram, E., 150, 175  
 Schubert, K.R., 203  
 Schuijlenburg, H., 232  
 Schuler, K.P., 383  
 Schumann, D.L., 132  
 Schutte, W., 76  
 Sciubba, A., 176  
 Sciulli, F., 89, 90, 92, 106, 122  
 Scott, M.B., 76  
 Scott, R., 126  
 Scott, W., 383  
 Scott, W.T., 76  
 Scribano, A., 232, 301  
 Sedgbeer, J.K., 76  
 Seely, M.L., 383  
 Segler, S.L., 176  
 Segre, E., 75  
 Segre, S., 122  
 Seguinot, J., 203  
 Seidl, A., 243  
 Seidl, W., 300  
 Seidman, A., 301  
 Seki, R., 382  
 Seltzer, S.M., 39, 40, 75

*Index*

411

- Semenov, V.K., 232  
 Sessoms, A.L., 277–8, 284  
 Sestilli, I., 323  
 Seyboth, P., 382  
 Shaevitz, M.H., 322  
 Shafer, R.E., 323  
 Shah, T.P., 383  
 Shannon, S., 283  
 Shapira, A., 76  
 Shapiro, G., 258  
 Sharp, P.H., 382  
 Sheaff, M., 322, 382  
 Shen, G., 71–2, 76, 383  
 Shibata, H., 300  
 Shibuya, H., 300  
 Shiino, K., 258  
 Shinsky, K., 283  
 Shmeleva, A., 301  
 Shoemaker, F.C., 323  
 Shutt, R.P., 28, 122, 300  
 Sidwell, R., 300  
 Siebert, H.W., 322, 382  
 Siemann, R., 76  
 Siffert, P., 76  
 Sinclair, D., 350  
 Sinervo, P., 300  
 Sinram, K., 355  
 Siskind, E.J., 322  
 Skubic, P., 322, 382  
 Slater, W.E., 193  
 Slattery, P., 123  
 Slaughter, A.J., 76, 300, 383  
 Sleeman, J.C., 176  
 Sloan, T., 323, 355  
 Smirnov, V., 132  
 Smith, D., 383  
 Smith, E.S., 132  
 Smith, K.M., 122  
 Smith, S.D., 283  
 Smith, V.J., 322, 382  
 Smith, W.H., 323  
 Smits, J.W., 232  
 Snow, G., 176  
 Soding, P., 76, 91  
 Solomon, J., 323  
 Solovianov, V., 322  
 Somov, S.V., 232  
 Song, J., 300  
 Sosnowski, R., 322  
 Souder, P.A., 383  
 Spengler, J., 322  
 Spierenburg, W., 258  
 Spiro, M., 383  
 Sproston, M., 323, 355  
 St. Lorant, S.J., 383  
 Stahelin, P., 257, 355  
 Stampke, S., 323  
 Stanek, R., 323  
 Stanga, R., 232  
 Stanton, N.R., 300  
 Stefanini, A., 232, 301  
 Steiner, E., 382  
 Steiner, H., 224, 232, 382  
 Steiner, V.C., 301  
 Stekas, J., 284  
 Sternheimer, R.M., 39–41, 75  
 Steuer, M., 322  
 Sticker, H., 176  
 Stier, H.E., 323, 355  
 Stiewe, J., 203  
 Stockhausen, W., 147, 176, 323, 355  
 Stone, S.L., 283  
 Storr, K.M., 122  
 Stradner, H., 322  
 Strait, J., 76  
 Strand, R.C., 175  
 Strauch, K., 356  
 Strauss, J., 383  
 Streit, K.-P., 322, 382  
 Strominger, A., 284  
 Strovink, M., 323  
 Strub, R., 322, 382  
 Struczinski, W., 283–4, 301, 323  
 Stumer, I., 283, 323  
 Sugahara, R., 301  
 Sugimoto, S., 354  
 Sulak, L., 76  
 Sumarokov, A., 301  
 Sumorok, K., 383  
 Surko, P., 323  
 Sydoriak, S.G., 126  
 Szonccso, F., 383  
 Takahashi, Y., 300  
 Takeshita, T., 232  
 Takikawa, K., 383  
 Talman, R., 75–6  
 Tamm, I., 180  
 Tanaka, Y., 156  
 Tang, H.W., 355  
 Tang, L.G., 355  
 Taniguchi, T., 232  
 Tao, C., 383  
 Tasaka, S., 300  
 Tatsumi, S., 300  
 Tauscher, L., 175  
 Tavernier, S., 300  
 Taylor, T.M., 332, 354–5  
 Tejessy, W., 254, 258  
 Teramoto, Y., 257  
 Teranaka, M., 300  
 Thenard, J.M., 176, 323, 355  
 Thomas, J., 76  
 Thomas, R.H., 121, 123

412 *Index*

- Thome, W., 382  
 Thompson, G., 383  
 Thompson, J.C., 323, 355  
 Thompson, P.A., 123, 382  
 Thompson, R., 122  
 t'Hooft, G., 27  
 Thorn, C.E., 232  
 Thorndike, E.H., 283  
 Thresher, J.J., 322, 382  
 Thun, R., 243  
 Timmer, J., 383  
 Timmermans, J., 232  
 Ting, S.C., 355, 376–8, 383  
 Tischhauser, J., 300  
 Tittel, K., 382  
 Tkach, I., 75  
 Toevs, J.W., 356  
 Toki, W., 269  
 Tompkins, J., 356  
 Touboul, M.C., 203  
 Tovey, S.N., 322, 382  
 Townsend, J., 257, 394–5  
 Trines, D., 76  
 Trischuk, J., 300  
 Troncon, C., 203  
 Troster, D., 175  
 Tsai, Y., 39, 48, 62–3, 75  
 Tscheslog, E., 383  
 Tsuzuki, Y., 300  
 Tung, K.L., 355  
 Tuominiemi, J., 383  
 Turala, M., 252, 258, 322  
 Tzeng, L., 300
- Udo, F., 257, 355  
 Ueno, K., 76  
 Uggerhoj, E., 76  
 Uldry, M., 232  
 Ullaland, O., 322  
 Upton, A.C., 123  
 Urban, L., 323, 355  
 Urban, M., 258  
 Ushida, N., 300
- Valente, V., 258, 355  
 Van der Meer, S., 379, 383  
 Van Staa, R., 203  
 Van Swol, R., 232  
 Vanhoy, J., 300  
 Vannucci, F., 355  
 Vascotto, A., 322  
 Vasiljev, P., 301  
 Vavilov, P., 45, 75  
 Veillet, L., 300  
 Velasco, J., 232  
 Vella, E., 283  
 Ventura, L., 203
- Verkerk, C., 28, 323  
 Vermeulen, J.C., 252, 258  
 Vialle, J.-P., 383  
 Villari, A., 322  
 Vincelli, M.L., 232, 301  
 Vivargent, M., 323, 355  
 Voci, C., 322  
 Volk, J.T., 132  
 von Dardel, G., 355  
 von Engel, A., 214, 232  
 Von Gagern, Ch., 354  
 von Holtey, G., 323, 355  
 Vorobyov, A., 75  
 Voss, G.A., 100, 122  
 Vraast Thomsen, C., 76  
 Vrana, J., 383  
 Vranic, D., 175  
 Vuillemin, V., 382–3  
 Vysocansky, M., 203
- Wacker, K., 356  
 Wagner, A., 242, 257  
 Wagner, R.L., 176  
 Wagoner, D.E., 176  
 Wahl, H.D., 322, 383  
 Wahlen, H., 147, 176, 323, 355  
 Waite, A.P., 122  
 Walenta, A.H., 41, 45, 75, 232, 258  
 Wallraff, W., 76  
 Wang, Ch., 355  
 Wang, C.L., 41, 45, 75  
 Wang, D.W., 355  
 Wang, E., 132  
 Wang, T.C., 382  
 Wang, X.R., 355  
 Wang, Y., 283  
 Watkins, P., 383  
 Watson, E., 323, 355  
 Watt, R.D., 300  
 Waurick, G., 300  
 Websdale, D.M., 301  
 Wedemeyer, R., 76  
 Wegener, D., 322  
 Wei, P.S., 355  
 Weinberg, S., 350  
 Welford, W., 176  
 Wenninger, H., 300  
 Wenzel, W.A., 258, 323  
 Werlen, M., 383  
 Wermes, N., 76  
 Wetherell, A.M., 257, 355  
 Weygand, D.P., 301  
 Whalley, M.R., 82, 91  
 Wheeler, C.D., 257, 323  
 White, M., 355  
 White, S.N., 176  
 White, V.A., 323, 355

*Index*

413

- Whitman, R., 322  
 Whitmore, J., 91  
 Whitaker, J.S., 283  
 Wicklund, E., 76  
 Wiegand, C.E., 382  
 Wiggers, L.W., 258  
 Wiik, B.H., 76, 203, 257  
 Wilkinson, C., 314, 322  
 Willen, E.H., 300, 323  
 Williams, D., 323, 355  
 Williams, W.S., 27, 92, 323, 355  
 Willis, S.E., 203  
 Willis, W.J., 283–4, 301, 323, 332, 335, 354–5  
 Willutzki, H.-J., 176  
 Wilson, J., 383  
 Wilson, R.R., 95, 100  
 Wimpenny, S.J., 323, 355  
 Winik, M., 301, 355  
 Winston, R., 176  
 Winter, K., 257, 354–5  
 Winters, I., 300  
 Wise, J., 308  
 Wisinski, D.E., 176  
 Witzeling, W., 355  
 Wojcicki, S.G., 322  
 Woldring, M.G., 232  
 Wolf, G., 76, 91  
 Wollstadt, M., 76, 257  
 Woodworth, P.L., 76, 176  
 Woody, C., 153–4, 355  
 Worsell, M.F., 323  
 Wright, S.C., 284  
 Wroblecka, W.T., 284  
 Wu, C.-S., 75, 382  
 Wu, G.H., 355  
 Wu, S.L., 76, 203, 269, 336, 355, 383  
 Wu, T.W., 355  
 Wyatt, T.R., 76  
 Wylie, A., 301  
 Xi, D.M., 233  
 Xi, J.P., 355  
 Xie, Y.G., 383  
 Yamada, R., 132  
 Yamamoto, Y., 283  
 Yanagisawa, Y., 300  
 Yang, P.C., 355  
 Ye, C.H., 237  
 Yodh, G.B., 300  
 Yokota, J., 300  
 Yokoyama, C., 300  
 Yoon, T.S., 300  
 Youngman, C., 76  
 Yount, D.E., 382  
 Ypsilantis, T., 203  
 Yu, C.C., 355  
 Yu, X.H., 355  
 Yuan, L.C., 75, 323, 382  
 Yuda, T., 283  
 Yung, K., 323  
 Yvert, M., 383  
 Zanello, D., 203  
 Zanello, L., 203  
 Zhang, N.L., 355  
 Zhu, R.Y., 355  
 Ziegler, J.F., 118, 123  
 Zioutas, K., 175  
 Zitoun, R., 323  
 Zoernig, G., 76, 203  
 Zrelov, V.P., 188, 203  
 Zumerle, G., 203  
 Zurfluh, E., 383

## Subject index

- Absolute responsivity, 161, 164  
 Absorption cross section, 81–3  
 Absorption length, 81–3, 275  
 Accelerator, 93–102  
 Acceptance, 26, 328  
 Accidentals, 139, 307  
 Acoustic radiation, 74–5  
 Active target, 129  
 Aerogel, 193  
 Afterpulsing, 164–5  
 Albedo events, 299  
 Alignment, 19  
 Analog/digital converter (ADC) (*see also*  
   Flash ADC), 143–4, 171, 248, 316  
 Analog methods for wire chambers, 228  
 Analyzing power, 373  
 Angular distribution, 87–91  
 Annihilation, 46, 53–4  
 Anti-(veto) counter, 167–8, 304, 337  
 Antineutron, 315  
 Antiparticle, 4, 5, 10  
 Antiproton  
   beam, 102, 107  
   interactions, 82, 85, 87  
   multiple scattering, 71  
   trigger, 312  
 Antiproton–proton collider, 101–2, 115  
 Arrival time method, 231  
 Atomic properties of common materials, 84  
 Atomic properties of elements, 83  
 Atomic shell, 42, 56  
 Attachment in gases, 211, 215, 223, 253,  
   268, 290  
 Attenuation coefficient, 392  
 Attenuation length, 155, 159  
 Auger electron, 56  
 Axial field magnet, 331–2, 346  
 Axial field spectrometer (AFS), 346–7  
 Background, 17, 307, 374  
 Bargmann–Michel–Telegdi equation, 362  
 Barium fluoride, 333–4  
 Barn, 391  
 Baryon, 3, 9  
 Baryon quantum number, 7  
 Beam–beam events, 367  
 Beam dump, 120, 130  
 Beam monitor, 74, 115, 207  
 Beam profile, 113–14  
 Beam transport, 108–15, 329  
 Bending magnet (*see* Dipole magnet)  
 Betatron oscillation, 97  
 Bethe–Bloch formula, 35–41  
 BGO, 149–50, 333–4  
 Bhabha scattering, 46, 65–6, 115, 299  
 Binding energy, 274–5  
 Binomial distribution, 389  
 Biological effectiveness, 120  
 Booster, 97  
 Bragg peak, 33  
 Branching ratio, 10, 366  
 Bremsstrahlung  
   coherent, 73–4  
   ordinary, 47–53, 59, 260  
 Brookhaven, AGS, 95, 376  
 Bubble chamber, 4, 16, 23, 25, 129,  
   285–8, 333, 367  
 Burst guard discriminator, 136–7  
 Calibration, 17, 19  
 Calorimeter  
   continuous, 259, 266, 333–4  
   electromagnetic, 266–74, 337–9,  
     341–5, 347–8, 379  
   hadron, 74, 278–9, 315–6, 337–9,  
     342–7, 379–80  
   liquid argon, 268–71, 275, 277–8, 316



## Index

415

- particle identification, 280
- PWC, 268–9, 272, 349–50
- readout, 266–8
- resolution, 269–72, 279–81
- scintillator, 152, 267–9, 273, 315–16
- uranium, 278–81
- CAMAC, 19, 141–2, 227–8
- Cascade particle, 9, 312–15, 365
- Cathode pad (strip), 228–30, 256
- Center of momentum (CM) frame, 11–13
- Central detector, 333, 379
- Cerenkov angle vs velocity, 180
- Cerenkov counter
  - absorption, 201–3
  - aerogel, 193–6, 346
  - differential, 184, 196–201, 349
  - efficiency, 191–2, 194–5
  - gas, 186–90, 193–5
  - intensity monitor, 115
  - particle identification, 335
  - radiator, 183
  - threshold, 184, 190–6, 310–1, 346, 377
  - total internal ref, 190–1
  - (*see also* DISC, Lead-glass, Ring imaging counters)
- Cerenkov effect, 42, 178–83
- CERN
  - ISR, 100–2
  - LEAR, 102
  - LEP, 102–3
  - PS, 95, 102
  - SPS, 95, 100, 102, 107
- Channeling (radiation), 73–4
- Characteristic energy, 238
- Characteristic length, 113
- Charge, measurement of, 358–9
- Charge coupled device (CCD), 248, 257
- Charge division, 230–1, 346
- Charge exchange in gases, 211
- Charged current interaction, 88
- Charged hadron beam, 107
- CHARM spectrometer, 246, 337–8, 340
- Chord, 326
- Clearing field, 290
- Clipping, 146
- Clusters, ionization, 255, 296–7
- Coaxial cable, 144–6
- Cockcroft–Walton accelerator, 94
- Coincidence curve, 138, 140, 329–30
- Coincidence overlap, 137
- Coincidence unit, 137–41
- Coincidence width, 137–8
- Colliding beam accelerator, 99–102
- Collimator, 103
- Collision length, 81
- Collision time, 32, 395
- Compton effect, 56–8
- Computer, online, 17, 352
- Constant fraction discriminator, 136
- Constants, physical, 385
- Cooling, phase space, 101–2
- Coplanarity, 305, 307
- Cornell, CESR, 100
- Cosmic rays, 14, 74, 118–19, 349
- Coulomb interference cross section, 370
- Coulomb scattering, 64–7, 370
- Coupling, electronic, 134–5
- Crate controller, 141
- Crazing, 153
- Critical angle
  - channeling, 72–3
  - internal reflection, 157
- Critical energy, 52–3, 260
- Critical pressure, 187–8
- Critical temperature, 187–8
- Cross section and probability, 391–2
- Cryogenic liquids, 126
- Crystal Ball spectrometer, 347–9
- Curvature, 23, 326
- Cyclotron frequency, 363
- Dalitz plot, 26
- Dark current, 165
- Data acquisition, 351–4
- Data analysis, 18–26
- Deadtime, 15, 316
- Decay length, 7
- $dE/dx$ 
  - in liquid or solid, 35–6, 286, 288
  - in gases, 41, 239, 254
  - measurement of, 167, 169, 252–5, 286, 288, 359
  - particle identification, 252–7, 335
- Delay curve (*see* Coincidence curve)
- Delay line, 230, 249
- Delta ray (knock-on electron), 42, 44–5, 192–3, 208, 224, 288
- Density effect, 40–1, 44
- Depolarizing resonance, 99
- DESY
  - DORIS, 100
  - HERA, 102–3
  - PETRA, 100–1
- Detailed balance, 362
- Detector uses, 17
- Differential cross section, 392
- Diffraction scattering, 85, 368
- Diffusion, 212–13, 236–9, 249–50, 256
- Dipole magnet, 96, 108–11, 331–2, 339, 344
- Dirac theory, 37, 59, 362
- Direct pair production, 53
- Direct photon, 309–10, 315
- DISC Cerenkov counter, 197–9, 314

416 *Index*

- Discriminator, 134–7  
 Dispersion, 178–9, 197  
 Distribution function, 388  
 Double nuclear scattering, 129, 372  
 Double pulse resolution, 135  
 Drift chamber  
   construction, 241–6, 251  
   cylindrical, 18, 242–5  
    $dE/dx$ , 252–7  
   degradation, 252  
   efficiency, 239, 245  
   electronics, 247–9, 251, 341  
   gas, 234–40, 243, 256, 345  
   high voltage, 245  
   magnetic field, 235–7  
   monitor, 249  
   planar, 241–2, 345  
   principle, 234–5  
   space-time relation, 234, 242, 252  
   spatial resolution, 234, 236–7, 239, 249–52  
   time response, 333  
   tubes (PDT), 245–6, 340–1  
   (see also Time projection chamber)  
 Drift space, 108, 110  
 Drift velocity, 212–13, 235–40  
 Duty cycle, 93
- $E \times B$  correction, 20, 225, 235, 241  
 Effective mass, 6, 7, 320–1, 365  
 Elastic scattering  
   coherent, 81–2  
   electromagnetic, 64–7  
   hadronic, 80, 368–72  
   luminosity, 115  
   quasi-, 81–2  
   spectrometer, 328–9, 371–2  
   TOF, 172  
   trigger, 305–7, 318  
 Electromagnetic shower, 14, 16, 46, 259–66, 270–1, 273  
 Electromagnetic shower detector (see Calorimeter)  
 Electron  
   annihilation, 53–4  
   beam, 96, 106, 330, 375  
   bremsstrahlung, 47–53  
   channeling, 74  
   detection, 201–2, 266–74, 279, 286, 294, 335, 375–80  
   energy loss to radiation, 51–3  
   energy spectrum, 270–1, 273  
   ionization loss, 41, 46–7  
   magnetic moment, 8, 9, 363  
   mass, 8, 9  
   multiple scattering, 71  
   pair production, 59–63  
   polarized scattering, 88, 374  
   pulse height spectrum, 45  
   radius, 38  
   range, 47  
   relativistic rise, 47  
   shower, 259–66  
   spectrometer, 375, 377, 380  
   spin, 362  
   trigger, 308, 310–11  
 Electron affinity, 211  
 Electron–positron collider, 100–2, 115  
 Electron–electron interactions, 85, 87  
 Electroweak interaction, 3  
 EMC spectrometer, 246, 249, 319, 336, 340  
 Emittance, 113  
 Empty target correction, 72, 369, 372  
 Emulator, 317, 352  
 Emulsion, 16–17, 288–9  
 Energy deposition of 10 GeV proton, 275  
 Energy loss (see  $dE/dx$ , Ionization energy loss)  
 Energy transfer, maximum, 13–14  
 European Hybrid Spectrometer (EHS), 202  
 Excitation, 208  
 Expectation value, 388  
 External muon identifier, 286
- Fan in/out, 142–3  
 FASTBUS, 142  
 Fermi momentum, 126, 128  
 Fermi plateau, 40–1  
 Fermilab  
   main ring, 95, 97–8, 106–7, 130  
   Tevatron I, 102–3  
 Filter, event, 20  
 Fission compensation, 278–81  
 Fixed target accelerator, 94–9  
 Flash ADC, 248, 255  
 Flash tube detector, 266, 298, 333  
 Flat top, 98  
 Fluorescence, 56, 148  
 Fluorescent converter, 157  
 Flux monitors, 115–17  
 Foam limit, 287  
 Foil, radioactive, 115–17  
 Form factor, 370  
 Forward particle, 10–11, 87–8  
 Four-vector, 6  
 Frank–Condon principle, 151  
 FREJUS spectrometer, 349–50  
 Frequency function, 388
- $g$  factor, 362  
 $g$  factor anomaly, 362  
 $g$ -2 experiments, 359  
 Gas Cerenkov radiator, 188, 193  
 Gas jet target, 15, 130–1

## Index

417

- Gases, fundamental processes, 208–15  
 Gate generator, 143  
 Gauge boson, 3, 5, 8, 89  
 Gaussian distribution, 389–90  
 Geiger mode, 206–7, 268  
 Geometrical fitting, 22–4  
 Giant resonance, 55  
 Gluon, 5  
 Gravitational force, 2, 5  
 Graviton, 5
- Hadron, 3, 79  
 Hadronic shower, 274–8, 281  
 Hall probe, 328  
 Heavy ions, 74, 120  
 Helical trajectory, 22–4, 325  
 High voltage system, 165–6  
 Hodoscope, 168–9  
 Holography, 288  
 Horn, neutrino, 105–6  
 Huyghens construction, Cerenkov, 181  
 Hybrid bubble chamber, 286  
 Hydrogen atom, radius, 49  
 Hydrogen, liquid, 36, 101, 125–7, 287  
 Hydrophone, 74  
 Hyperon, 3  
   beam, 108  
   decay, 90–1
- Impact parameter, 30–2  
 Inclusive production, 85–7  
 Index of refraction, 178–9, 182–3,  
   187–8, 190, 193, 202  
 Inefficiency, 22, 307  
 Interaction length, 392  
 Interferometer, 190  
 Ionization chamber, 115, 206–7  
 Ionization energy loss  
   classical, 30–4  
   fluctuations, 42–6  
   quantum, 34–42  
 Ionization in gases, 208–10  
 Ionization potential, 37–41, 208–9
- J particle, 376–9  
 Jet, 4, 316, 381
- K + detector, 298  
 Kaon  
   beam, 107  
   detection, 298  
   interactions, 82, 85  
   ionization loss, 35–6  
   mass, 8, 359  
   multiple scattering, 71  
   production, 86–7  
   properties, 8  
   range, 35–6, 298  
   TOF, 172–4  
   trigger, 306, 308, 312, 318  
 Kaonic atom, 359  
 KEK  
   synchrotron, 95  
   TRISTAN, 102–3  
 Kinematic fitting, 25–6
- Laboratory (LAB) frame, 10–12  
 Lagrangian multiplier, 26  
 Lambda particle  
   decay distribution, 363  
   magnetic moment, 9, 363–4  
   polarization, 363  
   precession angle, 364  
   production, 86–7  
   properties, 9  
   trigger, 309, 313  
 Landau distribution, 43–4, 53, 210  
 Large pt production, 88, 309, 316, 346  
 Larmor precession frequency, 236  
 Lead–glass counter, 156, 202–3, 315  
 Leading particle, 88  
 Left–right ambiguity, 241, 318  
 Lepton, 3, 8  
 Lepton number, 88  
 Lifetime, 364–6  
 Light collection, 156–61, 185–6, 197  
 Light guide, 157, 159–60  
 Limited streamer mode, 268  
 Linear accelerator (Linac), 94–6  
 Linear attenuation coefficient, 54, 63  
 Linear energy transfer, 120  
 Liouville theorem, 112, 160  
 Liquid hydrogen (*see* Hydrogen, liquid)  
 Logic levels, 134  
 Lookup table, 317  
 Lorentz invariant, 11–12  
 Lorentz transformation, 5, 6  
 Lorenz–Lorentz law, 187  
 Luminosity, 99, 101
- Magic gas, 216, 220  
 Magnetic field  
   configurations, 331–3  
   measurement, 328, 360, 364  
 Magnetic moment, 10, 362–4  
 Magnetic shield, 165  
 Magnetostriction, 293  
 MARK III spectrometer, 175  
 Mark-J spectrometer, 341, 345  
 Marx generator, 293  
 Mass, measurement of, 359–61  
 Mass attenuation coefficient, 63  
 Mean free path, 81  
 Meson, 3, 8

418 *Index*

- Minimum bias trigger, 304
- Minimum ionization, 38
- Missing mass, 26
- Mobility, 212
- Moliere radius, 264
- Moliere theory of multiple scattering, 69–73
- Moller scattering, 46, 65, 375
- Momentum resolution, 326–7, 329, 332
- Momentum transfer, 14
- Monitoring, 17, 169, 175, 202, 249, 351, 354
- Monte Carlo technique, 26
- Motion of ions in E and B fields, 235–7, 394–5
- Mott scattering, 65, 375
- Multiparticle spectrometer (BNL), 241–2, 320
- Multiple scattering, 67–73, 197, 239, 327
- Multiplication, charge, 214–20, 268
- Multiplicity, 85–7, 89
- Multistep avalanche chamber, 225
- Multiwire Proportional Chamber (MWPC)
  - construction, 218–22
  - deadtime, 224
  - efficiency, 220–4, 226, 295
  - electronics, 225–31
  - electrostatic force, 219–20
  - energy resolution, 220
  - field distribution, 218–9
  - gas, 221, 268, 295
  - in magnetic field, 224–5
  - spatial resolution, 218, 223, 228, 231, 268
  - time resolution, 224, 337
  - trigger, 226
  - wire clusters, 223, 227
  - (*see also* Proportional chamber)
- Muon
  - beam, 107, 336
  - bremsstrahlung, 47
  - decay, 8, 361
  - detection, 279, 298, 332, 336, 341, 359
  - ionization loss, 35–6
  - lifetime, 8, 10
  - magnetic moment, 8, 363
  - mass, 8, 359
  - momentum in pion decay, 359–61
  - production, 85, 88
  - range, 35–6, 298
  - trigger, 298, 308, 311–12, 315, 319–21, 337
- NA1 spectrometer, 230
- NA3 spectrometer, 222, 227
- NaI scintillator, 149–50, 167, 333–4, 348
- Neutral current interaction, 88–9
- Neutral hadron beam, 107–8
- Neutrino
  - beam, 105–6, 341
  - detection, 129, 279, 282–3, 285, 336, 379
  - fission, 118
  - interactions, 88–91, 201
  - mass, 10, 359–61
  - solar, 118, 349
  - trigger, 303, 341
- Neutron
  - beam, 107–8
  - detection, 152, 167, 201, 280–2, 313–14
  - interactions, 79–83
  - lifetime, 9, 10
  - production, 55
  - properties, 9
  - trigger, 306, 308, 313
- NIM electronics, 133–4, 142
- Noise, 22
- Novosibirsk, VEPP-4, 100
- Nuclear magnetic resonance (NMR), 131–2, 328, 360–1, 364, 375
- Nuclear shadowing, 129
- Nucleon, 3
- Nucleon decay, 3, 14, 117, 193, 349–51
- Nucleus, radius, 83
- Offline analysis chain, 19
- Omega particle, 3, 4, 9, 313–15, 365–6
- Omega spectrometer, 104, 318
- Optical theorem, 370
- Pair production, 42, 59–63, 260
- Parity, 88, 363
- Particle identification, 16–17, 25, 252–7, 280, 335
- Particle physics, 1, 2
- Pattern recognition, 20–2, 318, 381
- Pedestal, 144
- Penning effect, 210
- Periodic table, 387
- Phase space ellipse, 113–14
- Phosphorescence, 148
- Photoelectric effect, 54–6
- Photomultiplier tube (PMT), 159, 161–5, 172, 174, 182, 186, 193–4
- Photon
  - annihilation, 53–4
  - beam, 104–5, 115
  - bremsstrahlung, 47–52
  - channeling, 73–4
  - Compton effect, 55–8
  - detection, 152, 167, 200–3, 266–74, 279, 286, 341, 347
  - hadronic interactions, 84–5
  - pair production, 55, 59–63
  - photoelectric effect, 55–6
  - shower, 259–66
  - trigger, 308–10, 349

- Photonuclear absorption, 55  
 Physics analysis, 26  
 Pickup electrode, 115  
 Pileup, 270, 336  
 Pion  
   beam, 107, 360, 369  
   channeling, 72–3  
   decays, 8, 202, 360, 366, 378  
   detection, 279, 315  
   energy spectrum, 273  
   interactions, 82, 85–6  
   ionization loss, 35–6, 41  
   mass, 8, 359  
   multiple scattering, 71–3  
   production, 86–8, 107  
   range, 35–6, 298  
   shower, 273–5  
   spin, 362  
   TOF, 172–4  
   trigger, 308–11  
 Pionic atom, 359  
 Plasma frequency, 41  
 Poisson distribution, 389  
 Polarization, 12, 372–6  
 Polarized target, 15, 131–2, 337, 374–6  
 Positron  
   annihilation, 53–4  
   bremsstrahlung, 48  
   channeling, 74  
   ionization loss, 46–7  
   pair production, 59–63  
   shower, 259–66  
 Positronium, 54  
 Potential energy vs atomic spacing, 151  
 Preprocessing, 19–20  
 Pretrigger, 304  
 Primary ionization, 208–9  
 Primary ionization rate, 43  
 Probability, 388–92  
 Projected space angle, 69, 70  
 Proper time, 6  
 Proportional chamber  
   gases, 45, 216–18, 281  
   principles, 16, 205–8  
   pulse height, 45  
   (*see also* Drift chamber, Multiwire Proportional Chamber)  
 Proton  
   beam, 93–4, 107  
   channeling, 72–3  
   detection, 279  
   hadronic energy loss, 274–5  
   interactions, 80–2, 85–7  
   ionization loss, 35–6, 41, 45  
   magnetic moment, 9, 363  
   mass, 9  
   multiple scattering, 71, 73  
   range, 33–6, 298  
   recoil mass distribution, 372  
   spin, 9, 362  
   TOF, 173  
   trigger, 308, 312–13  
   (*see also* Nucleon decay)  
 Proton–proton collider, 100–1, 115  
 Proton–proton interactions, 367  
 Punch through, 311  
  
 Quadrupole magnet, 94, 97, 109–15  
 Quality factor, 120  
 Quantum chromodynamics (QCD), 4, 5, 376  
 Quantum efficiency, 161, 163–4  
 Quantum electrodynamics (QED) 3, 29, 48, 59, 65, 85, 107  
 Quark model, 4, 91, 117, 359  
 Quasistable particle, 8, 10  
 Quenching  
   gases, 211, 239  
   scintillator, 150–2  
  
 Radiation length, 52, 260  
 Radiation protection, 120–2  
 Radiation sickness, 121  
 Radiative corrections, 372  
 Radio frequency quadrupole (RFQ), 94  
 Radioactive source, 119  
 Radioactivity, 115–17, 119, 122  
 Raether criterion, 215, 290  
 Range, 33–6, 45–6  
 Rayleigh scattering, 55  
 Recoil particle, 10–11  
 Recombination in gases, 206–7, 210–11, 293  
 Reflection, 157–9, 184–5  
 Register (latch), 143  
 Relativistic rise, 39–41, 253–5  
 Relativity, 5  
 Residual, 19  
 Resolving time, 137–8  
 Resonance, 3, 4, 80, 85, 89  
 Response time, 15  
 RF cavity, 94, 96  
 RF structure, 93–4  
 Ring imaging Cerenkov counter (RICH), 193, 198–200  
 Risetime method, 231  
 Rossi–Greisen equation, 69  
 Rutherford scattering, 64–6  
  
 Sagitta, 326  
 Sample mean, 388  
 Sampling calorimeter, 16, 259  
 Saturated avalanche mode, 268  
 Scaler, 143  
 Scattering, 10–14  
 Scintillation, 148

420 *Index*

- Scintillation counter  
 construction, 16, 148  
 deadtime, 333  
 $dE/dx$ , 167, 341, 360  
 efficiency, 167–8  
 energy resolution, 168  
 intensity monitor, 115  
 response time, 333  
 spatial resolution, 168–9  
 timing, 169–75  
 trigger, 165, 341
- Scintillation efficiency, 150
- Scintillator  
 decay time, 150–2  
 fibers, 155  
 glass, 156  
 inorganic, 148–9  
 liquid, 152  
 noble gas, 155–6  
 organic, 149–55  
 plastic, 153–5, 167, 174–5
- Screening, 40, 48–50, 59–61
- Secondary beams, 103–8
- Secondary emission monitor, 115
- Self-absorption, 151
- Semiconductor detector, 16, 129–30, 296–8, 360–1
- Separated beam, 112–3
- Separator, electrostatic, 103–4
- Serpukov, 95, 103
- Shower (*see* Electromagnetic or Hadronic shower)
- Sigma particle, 9, 10, 313–14
- Silicon detector (*see* Semiconductor)
- SLAC  
 linac, 94–6, 115, 286, 374  
 SLC, 102–3  
 SPEAR, 100, 347
- Slewing, 135–6
- Sokolov–Ternov effect, 99
- Solenoid magnet, 331–2
- Source, accelerator, 93–4, 99
- Space, charge repulsion, 213–14, 217
- Space–time relation, 234, 252
- Spark chamber, 289–93
- Spark counter, 298–300
- Spatial resolution, 15
- Spectrometer  
 colliding beam, 329, 341–9, 367, 379–80  
 design criteria, 329–36  
 fixed target, 328–9, 336–41, 360, 363–5, 369, 371, 375–7  
 magnetic relations, 325–7  
 nucleon decay, 349–50
- Spin  
 measurement of, 361–2  
 quantum number, 3, 38
- Spline fit, 24
- Split field magnet, 331–2
- Standard deviation, 389
- Statistics, 388–90
- Straggling, 45
- Strangeness quantum number, 3, 7
- Streamer chamber, 16, 210, 293–4, 336–7
- Strong interaction, 2, 3, 79–88
- Structural materials, 397
- SU(3) model, 3
- Synchrotron, 96
- Synchrotron oscillation, 97
- Synchrotron radiation, 47, 98–9, 335
- $t$  distribution, 12, 26
- Target, 125–32
- TASSO spectrometer, 174, 193–6, 244–5, 268
- Termination, cable, 145–6
- Thin lens approximation, 111
- Thomas–Fermi model of atom, 39, 49, 65
- Thomson cross section, 58
- Thyratron, 290
- Time/digital converter (TDC), 144, 171, 247–8
- Time dilation, 6, 7, 363
- Time of flight (TOF), 172–5, 298–300, 335
- Time projection chamber (TPC), 242, 256–7
- Toroidal magnet, 331–2, 337–40
- Total cross section, 79–85, 89, 367–9, 391–2
- Total specific ionization, 208–9
- Townsend’s ionization coefficient, 214
- Track length, 262
- Track sensitive target, 286
- Tracking, 15, 19, 333
- Transition radiation, 42, 294–7, 335
- Transmission, optical, 185–6
- Transmission measurement, 368–9
- Transport coefficient, 237–8
- Transverse momentum, 88
- Trigger  
 beam, 303–4  
 data acquisition, 336, 351–3  
 deposited energy, 315–7, 379  
 final state, 304–7  
 general properties, 16–17, 303–7  
 higher level, 316–21, 371  
 identified particle, 307–15  
 multiplicity, 305
- Truncated mean technique, 253–4
- Two body scattering, LAB frame, 393
- UA1 spectrometer, 18, 379–80
- Ultraviolet light, (UV), 159, 161, 179, 183–6, 200–1

*Index*

421

- Updating discriminator, 136  
Uranium calorimeter, 279–81, 347
- Vacuum, beam, 101, 130  
Van de Meer method, 368  
Variance, 388–9  
Vee, 25  
Velocity, measurement of, 172, 196  
Vertexing, 25
- Villari effect, 293  
Virtual particle, 11
- W* gauge boson, 3, 5, 18, 88, 379–81  
Waist, 113–14  
Wavelength shifter, 153–4, 157, 186, 267  
Weak interaction, 2, 3, 88–91  
Winston cone, 160–1
- Z* gauge boson, 3, 5, 89