

Index

- Accelerated Heavy Ions, 9, 13, 106
- Accelerated Light Ions, 6–7
- alpha scattering experiments, 1
- angular distribution measurements, 120, 227, 250
- Angular Distribution of Heavy Residues, 96, 225, 229
- Breakup fusion model (BUF), 80
- Breit–Wigner single level formula, 43, 48
- Calibration of HPGe detector, 107
- charge density, 3, 79
- Charged particle detector array, 122–123, 126, 235
- Complete fusion, 18, 31, 36, 88, 131, 139, 181, 216, 241, 249
- composite system, 9, 30, 70, 114, 249, 261
- compound nucleus
 - de-excitation sequence of, 52
 - compound nucleus reaction mechanism, 7
 - computer code,
 - ALICE 91, 85–86, 139, 147, 169, 172, 219
 - ALICE IPPE, 85–86
- CASCADE, 83–84, 139, 147, 176
- EMPIRE, 87
- GNASH, 84–85
- McGNASH, 84–85
- PACE 4, 82
- Coulomb breakup, 14
- Coulomb excitations, 14
- Coulomb factor, 257, 259–260
- Coulomb scattering, 15–16
- Critical angular momentum, 24, 77, 229, 235, 249, 258
- deep inelastic collision (DIC), 19, 22
 - time evolution, 22
- deformation of the nuclei, 28
- deformation parameter, 28
- diffuseness parameter, 23, 26–28, 78
- disintegration constant, 90
- Effective transmission coefficients, 49
- efficiency measurement, 107
- errors in the measured cross-sections, 137–138
- Evaporation spectra, 46, 75

292 *Index*

- excitation function, 131–132, 139, 149, 154, 156, 160, 163, 169, 182, 192, 196, 242, 248
exciton model, 57, 60
 Master equation approach, 60
extra push, 29
fast fission, 22, 26, 30, 52
Feeding Intensity Profiles, 229, 240
Fermi gas model, 45, 83, 140
Feshbach–Kerman–Koonin (FKK) model, 68
fission barrier, 51–52
 Single hump, 51
fission barriers, 51–52
 double humped, 52
 time evolution of, 22
fusion–fission process, 26
gamma detector array, 122–124, 230, 235
general purpose scattering chamber, 104, 107, 154
geometry dependent efficiency, 91, 108–109, 137
grazing impact parameter, 16, 19, 75
Harp–Miller–Berne (HMB) model, 65
Hauser–Feshbach formalism, 33, 38, 83–84
heavy ion interactions, 13, 21, 104, 131, 204, 220, 260
Heavy Ion Reactions, 34, 50, 100, 131, 241, 260, 263
 Complete Fusion, 36, 81, 131, 181
 Incomplete Fusion of, 34–35, 70, 181, 257, 265
high spin states, 13, 235, 263, 265
hot spot model, 71, 250
hybrid model, 33, 66–67
 geometry-dependent, 67
 Kalbach systematic, 67
ICF reaction dynamics, 229, 249, 252
ICF strength function, 251, 253, 259
ICF, dependence on
 Coulomb factor, 257
Entrance Channel Parameters, 249
incident energy, 252
projectile structure, 252
mass asymmetry, 254
 αQ value of the projectile, 255
In-beam Experiments, 89, 92, 122
in-vacuum transfer facility, 104
incomplete fusion (ICF), 31, 33, 70, 88, 131, 181, 220, 233, 241, 249, 255, 263
independence hypothesis, 7, 33, 39, 54, 260
Inter University Accelerator Centre (IUAC), 10, 93, 122, 230, 242
intra-nuclear cascade model, 67
isotopes of special interest, 267
L-S coupling scheme, 38
Large Hadron Collider (LHC), 12
Level density, 45, 82, 140, 176, 199
level density parameter, 46, 62, 82, 140, 159, 183, 193
level separation, 42
level width, 42
light nuclear particles (LNPs), 241
LINAC, 10
mass asymmetry parameter, 254
massive transfer reaction, 80–81, 249
maximum angular momentum, 26, 83, 258
mean input angular momentum, 258–259
mean life time, 63–64
multistep compound (MSC), 68
multistep direct (MSD) processes, 68
never-come-back approximation, 63
normalised beam energy, 251, 254
nuclear fission, 6
nuclear reaction mechanism, 7

- nuclear temperature, 47, 72
- nucleus, 2, 24, 36, 54, 70, 88, 172, 220
- Off-beam experiments, 91–92, 107
- particle-hole pairs, 57
- Pelletron accelerator, 10, 93, 94, 105, 124, 128, 205
- Phoswich detector, 127–128, 230
- Photo-multiplier tube, 125, 128
- pre-compound emission, 9, 31, 147, 172
- pre-compound particles, 9, 54
- pre-equilibrium component,
 $^{16}\text{O} + ^{169}\text{Tm}$ system, 242, 245
- pre-equilibrium components
 $^{16}\text{O} + ^{159}\text{Tb}$, 245
 $^{16}\text{O} + ^{169}\text{Tm}$, 245
 $^{16}\text{O} + ^{181}\text{Ta}$ systems, 245
- Pre-equilibrium Emission, 18, 22, 25, 33, 54, 68, 89, 193, 245, 260
- production cross-section, 89, 113, 132, 154, 184, 204, 228, 265
- projectile alpha Q value, 255
- projectile structure, 250, 252–254, 259
- projectile-like fragments (PLFs), 34
- promptly-emitted particles (PEPs) model, 71–72
- quantum mechanical model, 68
- quasi-elastic scattering, 18, 21
- reaction cross-section, 17, 34, 43, 84, 90, 148
- reaction residues
 - Identification of, 110
- Reactions initiated by ^{12}C beam, 139
 - $^{12}\text{C} + ^{128}\text{Te}$ system, 139
 - $^{12}\text{C} + ^{165}\text{Ho}$ system, 147
 - $^{12}\text{C} + ^{159}\text{Tb}$ System, 148
 - $^{12}\text{C} + ^{169}\text{Tm}$ System, 154
 - $^{12}\text{C} + ^{175}\text{Lu}$ System, 156
- Reactions initiated by ^{13}C beam, 163
 - $^{13}\text{C} + ^{169}\text{Tm}$ system, 163
- Reactions initiated by ^{14}N beam, 169
 - $^{14}\text{N} + ^{128}\text{Te}$ system, 169
- Reactions initiated by ^{16}O beam, 175
 - $^{16}\text{O} + ^{27}\text{Al}$ system, 175
 - $^{16}\text{O} + ^{159}\text{Tb}$ system, 178
 - $^{16}\text{O} + ^{169}\text{Tm}$ system, 181
 - $^{16}\text{O} + ^{103}\text{Rh}$ system, 185
 - $^{16}\text{O} + ^{181}\text{Ta}$ system, 186
- Reactions initiated by ^{18}O beam, 192
 - $^{18}\text{O} + ^{159}\text{Tb}$ system, 192
- Reactions initiated by ^{19}F beam, 195
 - $^{19}\text{F} + ^{159}\text{Tb}$ system, 195
 - $^{19}\text{F} + ^{169}\text{Tm}$ system, 198
- Recoil range distribution,
 system $^{12}\text{C} + ^{159}\text{Tb}$, 204
 system $^{16}\text{O} + ^{159}\text{Tb}$, 213
 system $^{16}\text{O} + ^{169}\text{Tm}$, 216
 system $^{16}\text{O} + ^{181}\text{Ta}$, 220
- resonance, 36, 43, 54
- RRD measurements, 115, 247
- Rutherford, 1, 4, 16
- Rutherford scattering, 16, 19
- saddle point, 28–29, 140, 183
- sharp cutoff model, 34
- spin cutoff parameter, 46, 82
- Spin Distribution,
 system $^{16}\text{O} + ^{169}\text{Tm}$, 230
 $^{12}\text{C} + ^{169}\text{Tm}$ system, 235
- stacked-foil-activation technique, 32
- statistical compound reaction model, 36, 113
- sum rule modelm 75, 77, 80
- super heavy nuclei (SHE), 19
- surface thickness, 2
- synchrocyclotrons, 7
- target ladder, 105
- Target Preparation, 100

294 *Index*

- target-like fragments (TLFs), 34
targets
 self-supporting, 100
 backing material, 100
transmission coefficient, 33, 37, 49
vacuum evaporation technique, 100, 115, 205,
 213
Width fluctuation correction, 48
Yrast line, 25–26, 52, 53, 84, 233