

SUBJECT INDEX

- Acceleration of particles, 428
Ambipolar diffusion, 78, 180
Angular momentum, transport of, 179, 250
Aurorae, 286, 296, 306, 312, 318, 329, 446
 diurnal and seasonal variations, 321
Auroral particles, energy of, 320, 328, 329
Auroral zones; eccentricity of, 320
 inner zones, 325
Axisymmetric case, 46
- Beam emitted from the sun, 13, 285, 297, 330,
 535
 capture effect of, 288
 cosmic rays in, 287, 333, 381, 402
 density of, 297, 299, 303, 309, 310, 318
 electric field effect of, 288
 magnetic field effect of, 288
 magnetic field in, 308, 345
 shock-waves in, 291
 turbulence in, 291
- Bondi-Gold theorem, 27-32
- Bremssstrahlung, 99, 102, 226
- Characteristic parameters, 52, 53, 62
- Chree's method, 339, 345
- Chromosphere; magneto-hydrodynamic waves
 in, 142, 145
 spicules in, 6
- Comet tails, 10
- Compressible medium, motion in, 15, 48, 180
- Contraction of interstellar cloud, 169
- Convection; inhibition by magnetic field, 58,
 61, 68, 69, 261
 in photosphere, 224
 in rotating fluid, 61, 66, 69
- Convective zones, stellar, 248
- Coriolis force, 68-70, 111, 161
- Corona, 10, 106
 heating of, 108, 109, 143
 magnetic field in, 275, 285
 magneto-hydrodynamic waves in, 145
 streamers of, 6, 10, 106, 275, 277, 279
 thermal conductivity of, 151
- Cosmic radiation; acceleration of, 9, 110, 361,
 381, 428
 anisotropy of, 377, 391, 399
 atmospheric effects, 353, 386, 393
 daily variations of, 377, 387, 392, 401
 extra-solar, 355, 370
 from flares, 11, 112, 147, 355, 357, 362, 372,
 376, 423
- galactic, 11
geomagnetic activity and, 329, 330, 345, 348,
 353, 381
impact zones of, 361, 371, 376
ionization chamber recordings, 406
measurements of, 375, 380, 386, 394, 401,
 402, 406
neutron recordings, 358, 404
onset times, 371, 373, 412, 418
origin of, 9
point source of, 441
spectrum of, 356
sun, from, 226, 244, 329, 355, 404
variations of intensity, 420
27-day variations, 330, 334, 336, 352, 353,
 401, 420
- Crab nebula, 10, 199, 517, 520, 524
 optical emission from, 520
- 'Creeping' diffusion, 74
- Discharges, high current, 451, 464
- Double Cluster in Perseus, 204
- Drift motion of charged particles, 81, 313, 325
- Dynamo; magneto-hydrodynamic, 8, 27, 47,
 57, 106, 111, 172
 migratory waves, 255
- Earth's magnetic field, 27, 296, 313, 325, 370,
 447
 cosmic rays in, 393, 404
- Electric quasi-neutrality, 73, 315
- Electrical conductivity, 513
 in magnetic field, 8, 75, 77, 109, 141, 331,
 481
 see also Resistivity
- Energy, conservation of, 16, 18, 51, 52
- Evershed effect, 120, 258
- Experiments; conditions of, 53, 54
 with ionized gas, 56, 87, 113, 273, 312, 451,
 464
 magneto-hydrodynamic, 50
models of cosmical phenomena, 53, 54, 96,
 113, 316, 323
- Facculae, spectra of, 114
- Fermi's acceleration mechanism, 110, 210, 422
- Field lines, 28, 37
 'frozen', 28, 53, 106, 172, 181, 198
 'motion' of, 76, 124
 'slip' of, 180
twisted, 34, 58, 93, 173, 179, 195, 198, 276

- Filaments and magnetic fields, 245
 Flares, 226
 and aurorae, 353
 mechanisms of, 108, 109, 123, 133, 135, 138,
 141, 145
 spectra of, 114
 Forbush decrease, 290, 329, 370, 420, 424
 Granulation, 6, 143
 in sunspots, 69
 Hall term, 75, 141, 142, 157
 Heat diffusion equation, 19, 51
 'Hot spots' in stellar atmospheres, 225-8
 'Hydrogen bombs', 145
 Hydrogen convection zone, 11, 248
 Ionized gas; diamagnetism of, 83
 inductive capacities of, 83
 three-fluid model, 77
 two-fluid model, 74
 waves in, 81, 141
 Ionosphere, 9, 10, 78, 106, 326, 327
 Instability; of line current, 101, 102, 454
 of magnetohydrodynamic flow, 34, 39, 44,
 57, 58
 at neutral point, 109, 123, 128, 129, 136, 137
 of plasma in magnetic field, 315, 328
 Schlüter's, 277
 and thermal convection, 58, 61, 69
 of toroidal discharge, 102
 Interplanetary dust, 291
 Interplanetary gas, temperature of, 13, 14
 Interplanetary space; cosmic rays in, 355, 421
 density of, 10, 12, 13, 423
 electromagnetic phenomena in, 5, 9, 10, 12,
 284, 377
 magnetic field in, 284, 298, 300, 325, 327,
 356, 361, 364, 399, 421, 423, 427
 Simpson's model of, 364
 turbulence in, 290, 366, 369, 375, 422
 Interstellar gas, 8, 9, 281, 404
 Isorotation, Ferraro's law of, 107, 249
 K_p -index, 288, 291, 345, 380
 Lenz's law, 135, 136
 Magnetic energy of current system, 500
 Magnetic fields; amplification and generation
 of, 8, 27, 47, 57, 58, 202
 in astrophysics, 5
 decay of, 32, 34, 48, 106, 111
 force-free, 47, 48, 172, 254, 274
 general of the sun, 5, 245, 247, 279
 interstellar, 169, 182, 404, 416, 419
 in nebulae, 182
 photospheric, 239
 in radio sources, 529
 stellar, 8, 9, 161, 169
 in sunspots, 5, 239, 258, 263
 Magnetic moment of gyrating particle, 83,
 85
 Magnetic number, 62
 Magnetic regions; bipolar, 239, 242, 253
 unipolar, 239, 242
 Magnetic rotation and double refraction, 166
 Magnetic storms, 286, 295, 329, 332, 341, 534
 first phase, 300-3
 main phase, 301, 303, 324, 329
 Magnetic storms and aurorae, 329
 Alfvén's theory, 296, 312
 Chapman-Ferraro theory, 13, 287, 295
 Singer's theory, 329
 Magneto-hydrodynamic waves, 15, 33, 45, 55,
 79, 107, 109
 adiabatic, 16, 23
 existence of, 55
 experiments, 56
 isothermal, 16, 22
 in prominences, 121
 in solar atmosphere, 141
 and turbulence, 45, 56
 Magneto-hydrostatic fields, 499
 Meridional circulation, 248, 250
 Momentum, conservation of, 16, 17, 73
 Morrison's clouds, 369
 Nebulae, magnetic fields in, 182, 186
 Neutral point instability; *see* instability
 Novae and super-novae; ejection of matter,
 194
 emission lines, 195
 expansion of, 198, 200, 203
 magnetic fields in, 190, 193
 Nuclear reactions; formation of deuterium,
 228, 236
 neutron production, 228
 in stellar atmospheres, 118, 221, 222
 Overstability, 63, 70
 Partially ionized gas; *see* Plasma with neutral
 gas
 Pinch effect, 99, 102, 453, 464
 instability of, 101, 454, 459, 464, 491
 ionization degree, 485
 with longitudinal magnetic field, 460, 464,
 491
 radial motions, 102, 477
 Plasma with neutral gas, 78, 79, 109, 141, 170,
 181
 Plasma oscillations, 110
 Plasmoids, 87, 112, 113, 180, 315
 interactions of, 93-6
 production of, 91

- Polarization; measurements, 204
of starlight, 169, 413, 529
of zodiacal light, 10, 12
- Prominences, 6, 107, 108, 112, 120, 273
condensation of, 156
magnetic fields in, 150
spectra, 114
time scale, 155
- Protostars, 170, 180
- Radio bursts, 6, 147, 226, 518
emission from galaxies, 517
- Radio waves, 10, 353, 523
echoes from aurorae, 325
emission in magnetic field, 529
- Rayleigh's number, 62
- Resistivity, electrical, 8, 72, 172, 174, 281
(*see also* Electrical conductivity)
- Reynolds' number, 40, 52
- Ring-currents, 10, 98, 303, 328, 353, 448
stability of, 304, 310, 311
- Rotating fluid, convection in, 62
- Rotation, non-uniform of the sun, 110
- Satellites, artificial, 10
- Shock waves; in active regions on the sun, 118, 120
and aurorae, 329, 331
in interplanetary space, 291, 329, 536
- Similarity laws, 50, 52
- Solar atmosphere; convection in, 256
convection zones, 6, 11, 256, 257
- Solar cycle, 6, 11, 12, 370, 380
polarity of, 6
- Spiral arms, magnetic fields in, 529
- Stability; *see* Instability
- Star formation in magnetic field, 169, 179, 276
- Stars; magnetic variables, 175, 176, 179, 209, 223
oscillating, 177
rotating, 176, 211
- Störmertron, 446
- Sudden commencements, 324, 329, 330
- Sun; activity of, 6, 11, 114
general magnetic field of, 5, 27, 106, 110, 245
radio emission from, 110
supersonic motions in, 118, 120
turbulence in, 6, 110
- Sunspots; Alfvén's theory of, 107, 110, 256
cooling of, 68, 120, 261, 273
internal constitution of, 263
magnetic fields in, 5, 106, 120, 124, 144, 167, 168, 224, 258, 264
source of energy, 256
and thermal convection, 69, 108, 253
torsional oscillations, 108, 111
- Surges, 120
- Taylor instability, 180
- Taylor's number, 62
- Thermal conductivity in magnetic field, 101, 150, 157
- Thermonuclear reactions, 451
with deuterium, 452
efficiency of, 452
- Turbulence; Chandrasekhar's theory, 508
decay of, 41, 45, 55
Heisenberg's theory, 505
magneto-hydrodynamic, 9, 33, 57, 110, 172, 195, 245, 424, 504, 508
spectrum of, 38, 41, 504
in the sun, 6, 11, 120
- Virial theorem, 502
- Viscous dissipation, 20, 51
- Vortices, conservation of, 77, 79
- Whistlers, 10, 12
- Zeeman effect, 161, 166, 209, 210, 247
and Doppler broadening, 161–3
measurements of magnetic fields, 6, 110, 161–3, 165, 240, 245, 287
and turbulence, 240, 245, 287
- Zodiacal light, 10, 284