INDEX

ABI. See Auroral Boundary Index
ACE. See Advanced Composition Explorer
Ackerson, K. L., 9
Active Magnetospheric Particle Tracer Explorer (AMPTE), 80, 81
comets and, 263
Pluto and, 270
Active Magnetospheric Particle Tracer Explorer/Charge Composition Explorer (AMPTE/CCE), 146
Active Spacecraft Potential Control (ASPOC), 34
Active time, ion outflows in, 97–98
Advanced Composition Explorer (ACE), 64, 65f, 206, 220f
AE. See Auroral electrojet
AGO ASI, 368
Ahn, B.-H., 64
A-I-M system, 364
Akebono, 21, 22, 24, 27, 28f
on polar wind, 92–93
AKR. See Auroral kilometric radiation
Alexander, J. K., 12
Alfvén, Hannes, 145
Alfvénic frequencies, 370
Alfvénic Poynting flux, 12, 12f
Alfvénic structures, 370
Alfvénic waves, 360
acceleration of, 4, 9–11, 10f
O+ and, 79
plasma-sheet flux tubes and, 221
in MHD, 249–50
All-Sky Imagers (ASI), 366
Ambipolar electric field, 42, 268, 359
Ambipolar outflow, of Mars, 263
Ambipolar potential, 359–61
AMIE. See Assimilative mapping of ionospheric electrodynamics
AMPTE. See Active Magnetospheric Particle Tracer Explorer
AMPTE/CCE. See Active Magnetospheric Particle Tracer Explorer/Charge Composition Explorer
André, M. P., 24, 37, 38, 40, 44, 45
Angelopoulos, V., 221
Anti-sunward component, of IMF, 50, 50f, 52–53
ASI. See All-Sky Imagers
ASPERA-3, 263
ASPOC. See Active Spacecraft Potential Control
Assimilative mapping of ionospheric electrodynamics (AMIE), 63–64, 239
Atmosphere
gains of, 358
gas of, 369–70
lightning in, of Saturn, 278
MEPED and, 72–74, 72f
SEP and, 72–74, 73f
solar wind and, 358
of Titan, 253
Aurora emissions. See also Conjugate aurora
Birkeland currents and, 309, 312
FAC and, 249–50
at Jupiter, 251
at Mars, 263
at Saturn, 253
Auroral Boundary Index (ABI), 158
Auroral electrojet (AE), 65, 65f, 163
Auroral hiss, 282
Auroral ionosphere, 24, 358, 362, 366
Auroral kilometric radiation (AKR), 4, 12, 13f, 128
Auroral oval, 4, 10, 24, 158, 171, 171f
of Jupiter, 253
of Saturn, 253, 336
Auroral precipitation, 69–70, 69f, 71f
chorus waves and, 120
ECh and, 120
effects of, 66–68
global distribution of, 119–20
reversal boundary and, 52, 52f
Auroral zone, 44–45
plasma flows in, 50
Axford, W. I., 49
Backscattering, 4
Badman, S. V., 342
Bagenal, F., 330
Baker, D. N., 80, 82
Balloon Array for Radiation belt Relativistic Electron Losses (BARREL), 132
Barakat, A. R., 174, 181, 196–97
BARREL. See Balloon Array for Radiation belt Relativistic Electron Losses
Bartels, J., 145
BATS-R-US. See Block Adaptive Tree Solar Wind Roe-type Upwind Scheme
Baumjohann, W., 221
BBELF. See Broad band extremely low frequency
BBF. See Bursty bulk flows
Bertaux, J. L., 263
Birkeland currents, 246
  aurora emissions and, 309, 312
  RCM and, 216, 218f
  Saturn and, 311–12, 311f
Birn, J., 84
Blobs, plasma-sheet flux tubes as, 221
Block Adaptive Tree Solar Wind Roe-type Upwind Scheme
  (BATS-R-US), 103, 195
  conjugate aurora and, 227, 228–29, 230f, 232
Dst index and, 186, 186f
Enceladus torus and, 351
FAC and, 180, 181
GPW and, 179
ion outflows and, M-I coupling from, 169–76, 170f, 171f,
  172f, 173f, 174f, 175f, 176f
MHD and, 180, 198
to Saturn, 319, 320
Boardsen, S. A., 135
Boundary layer
  IMF and, 53f
  of magnetosphere, 52
Brambles, O. J., 15f, 80, 86, 190, 191, 196
Brice, N. M., 309–10
B-ring, of Saturn, 133
Broad band extremely low frequency (BBELF), 371
Bubbles, plasma-sheet flux tubes as, 221
Bunce, E. J., 343
Burch, J. L., 8–9
Bursty bulk flows (BBF), 221–22

Callisto, 269
Canadian GeoSpace Monitoring (CGSM), 367
CAPS. See Cassini Plasma Spectrometer
Carbary, J. F., 321
Cassini, 12, 14f
  Enceladus and, 268
  Enceladus torus and, 345–53, 346f, 347t, 348f, 348t, 349f,
    350f, 351f, 352f
  magnetometer of, 279, 279f, 293
MIMI of, 252–53, 293
RPWS of, 277, 278–79, 278f, 279f, 283
  Enceladus and, 350, 351f
Saturn and, 251, 323
  plasma waves of, 277–85, 278f, 279f, 280f, 281f, 284f
SKR and, 321
Titan and, 253
  Saturn’s magnetosphere and, 291–302, 292f, 293t, 294f,
    295f, 296f, 297f, 298f, 299f, 300f, 301f
UVIS on, 312
Cassini Plasma Spectrometer (CAPS), 267, 282, 293, 294,
  296, 311
  Enceladus and, 268
  injection-dispersion structures and, 314
CCE. See Charge Composition Explorer
CCMC. See Community Coordinated Modeling Center
CDAW. See Coordinated Data Analysis Workshop
CDAWeb, 229

Central plasma sheet, 52, 101
CGSM. See Canadian GeoSpace Monitoring
CHAMP, 369, 370f
Chandrayaan-1, 270
Chapman, S., 145
Chappell, C. R., 6
Charge Composition Explorer (CCE), 81
Chatanika, 4, 21, 50
CHEM, 146
Chen, A. J., 6, 7
Chen, L., 133
Chen, M. W., 157
Chen, Y., 311
Chorus waves, 118f
  auroral precipitation and, 120
  electron acceleration by, 120–21, 121f
  global modeling for generation of, 160–62, 162f, 163f
  MLT and, 156
  origin and global distribution of, 118–19
  in plasmasphere, 156
  of Saturn, 279–82, 280f, 281f
  Van Allen Probes and, 129–32, 131f
  VLF, 156
CIR. See Corotating interaction regions
Cladis, J. B., 80
Classical Polar Wind, 169, 170–72, 171f, 172f
PWOM and, 180
Cleft ion fountain
  ion outflows in active time and, 97–98
  polar wind and, 91–99
Cluster, 21, 80
  chorus waves and, 132
  cold ions and
    data set from, 37–43, 38f, 43f, 43t
    ion outflow and, 33–45
Cluster/Composition and Distribution Function
  (CODIF), 81
CME. See Coronal mass ejections
Coates, A. J., 263
CODIF. See Cluster/Composition and Distribution Function
Cold ions
  cluster and
    data set for, 37–43, 38f, 43f, 43t
    ion outflow of, 33–45, 35f
    densities and velocities, 38, 39f
    landing region maps for, 44f
    to magnetosphere, 41–42, 42f
Cold plasma density, 36
Cold plasma dispersion theory, 128–29
Coley, W. R., 24
Combined Release and Radiation Effects Satellite
  (CRRES), 119
EMIC and, 156, 163
MICS on, 146
  plasmaspheric hiss and, 133
Comet 67P, 270
Comet Grigg-Skellerup, 270
Comet Halley, 263, 270
Comets
- pickup ions and, 261–63, 261f, 262f
- pickup water of, 262–63, 262f
- solar wind and, 246–47, 263, 264f

Community Coordinated Modeling Center (CCMC), 227

Comprehensive Ring Current Model (CRCM), 8f, 216, 228–29

Conjugate aurora
- coordinate systems for, 228–29
- IMAGE for, 227–33, 229f, 230f, 231t
- magnetospheric model performance in, 227–33, 229f, 230f, 231t
- PCB and, 227, 230f, 232
- POLAR for, 227–33, 229f, 230f, 231t
- solar wind and, 228, 229

Convection. See also Rice Convection Model
- FAST and, 360f
- IMF and, 42
  - in ionosphere
    - anti-sunward component of, 52–53
    - in cusp, 53, 54f
    - at high altitudes, 49–57
    - IMF and, 50–51, 51f
    - ionospheric effects of, 56–57
    - magnetometer and, 50–51
    - merging of, 52–53, 55f
    - observations and interpretation of, 52–53
    - spatial and temporal variations in, 53–56
    - thermosphere and, 56–57
  - in magnetosphere, in ion outflows in active time, 98
  - in polar cap, 94
- SuperDARN and, 368–69
- of Titan, 294

Coordinated Data Analysis Workshop (CDAW), 82

Core Plasma Analyzer (CPA), 364, 371, 373

Coriolis acceleration, 311

Coronal mass ejections (CME)
- Dst index and, 64–65, 65f
- GPW and, 186
- Joule heating and, 66, 68f
- magnetopause and, 186
- PWOM and, 186
- RBSPICE and, 148–49, 148f, 149f
  - for ring current, 145
- SSC and, 186
- Dungey, J. W., 49, 52

Dynamics Explorer (DE), 21, 22, 24, 27, 28f, 51, 238, 357

Earth-like interactions, in magnetosphere, 246, 246f

ECH. See Electron Cyclotron Harmonic waves

EDI. See Electron Drift Instrument

EFP. See Electric Field Probe

EFW. See Electric Fields and Waves

EISCAT. See European incoherent scatter

EISCAT Svalbard radar (ESR), 24, 25–27

Electric and Magnetic Field Instrument Suite and Integrated
  Science (EMFISIS), 127, 129f

Chorus waves and, 130–31

Lighting whistlers and, 128–29

MAG in, 128, 160

Magnetosonic equatorial emissions and, 135

QP whistler-mode emissions and, 138

RAM-SCB and, 160, 160f
Electric Field Probe (EFP), 364
Electric Fields and Waves (EFW), 36, 37, 127, 128
Electromagnetic ion cyclotron waves (EMIC), 117, 118, 118f
CRRES and, 156, 156
global modeling for generation of, 158–60, 159f, 160f
in inner magnetosphere, 155–64, 159f, 160f, 162f, 163f
long-term relativistic electron decay by, 121–22
MLT and, 156
O+ and, 196
ring current and, 157
ULF, 156
Electron Cyclotron Harmonic waves (ECH), 119
auroral precipitation and, 120
of Saturn, 277, 278, 279, 280–81, 282–83
Electron Drift Instrument (EDI), 35–36, 37
ELF. See Extremely low frequency
Elphic, R. C., 53
EMFISIS. See Electric and Magnetic Field Instrument Suite and Integrated Science
EMIC. See Electromagnetic ion cyclotron waves
ENA. See Energetic neutral atom
Enceladus, 268–69
auroral hiss of, 282
L-shells and, 353f
magnetic flux and, 346
nanograins of, 268
photoelectrons of, 268
wake of, 350–52, 351f, 352f, 353f
water on, 252, 268, 310
Enceladus torus, Saturn magnetosphere and, 345–53, 346f, 347t, 348f, 349f, 350f, 351f, 352f
Energetic neutral atom (ENA), 146
of Saturn, 253, 320
of Titan, 299
Engwall, E. A., 34, 37, 38–39, 42, 43t
EPOP, 365
Equatorial magnetosonic waves (MS), 119
E-region, 62
E ring, of Saturn, 7
ESA. See European Space Agency
Escape rates
CIR and, 269
for non-magnetic solar system bodies, 269, 271, 271f
Espinosa, S. A., 321
ESR. See EISCAT Svalbard radar
Europa, 269
European incoherent scatter (EISCAT), 21, 24, 25, 26–27, 26f, 50, 367f
European Space Agency (ESA), 238, 239f. See also Cassini
EUV. See Extreme ultraviolet
Evans, D. S., 4, 9, 62
Eviatar, A., 310
Exosphere
of Mars, 263
mass-loading and, 247
of Pluto, 270
of Venus, 265
Expanding contracting polar cap model, 54
Explorer 14, 146
Extremely low frequency (ELF), 363, 370, 371
Extreme ultraviolet (EUV), 6–7, 6f, 27, 61
cold ion detection challenge and, 35
GPW and, 181
IMAGE and, 235
O+ and, 79
plasmasphere and, 235
thermosphere and, 359
of Titan, 300, 301f
Fabry-Perot Interferometer (FPI), 238
FAC. See Field-aligned currents
Far Ultra Violet (FUV), 158
Far Ultra Violet Imager/Wideband Imaging Camera (FUV/WIC), 228
Fast Auroral Snap-Shot (FAST), 4, 21, 359, 360f
CHAMP and, 369, 370f
on polar wind, 92
proton fluxes and, 158
Fast Fourier transform (FFT), 128
Fedorov, A., 265
Fejer, B. G., 218
Fennell, J. F., 132
Ferraro, V. C. A., 145
FFT. See Fast Fourier transform
Field-aligned currents (FAC)
aurora emissions and, 249–50
auroral ionosphere and, 362
BATS-R-US and, 180, 181
FAST and, 360f
of Jupiter, 251
of Saturn, 320, 321–22, 324f, 337–38, 340f, 342–43
Flare irradiance spectral model (FISM), 64
Flaring angle, 83
F-layer peak density, 67, 207, 209f
Flux transfer events, 53
Fok, M.-C., 157
Fokker-Planck simulation, 120
Fontaine, D., 50
For SEM, 205
FPI. See Fabry-Perot Interferometer
Francis, W. E., 80
Frank, L. A., 9, 152
F-region, 25, 27
ionosphere and, 365
plasmasphere and, 358
Freja, 21, 365
Fukazawa, K., 320, 327, 342, 343
FUV. See Far Ultra Violet
FUV/WIC. See Far Ultra Violet Imager/Wideband Imaging Camera
Galand, M., 300
Ganymede, 269, 270
Garcia, K. S., 190
Gardner, L. C., 175
Gas, of atmosphere, 369–70
Generalized Polar Wind (GPW), 169, 172–75, 360
BATS-R-US and, 179
CPCP and, 188, 189f, 190–91

Dst index and, 186
fluid/particle hybrid model for, 180–81
global simulations of, 174–75, 174f
ion outflows in quiet time and, 190
MHD and, 181
UT and, 182

Geocentric Solar Magnetospheric (GSM), 186, 187f, 190f, 199, 228

Geomagnetic storms, 62, 155, 174, 235, 249
Classical Polar Wind and, 171–72
Joule heating and, 64, 66–68
SED plumes in, 205–6

Geostationary Operational Environmental Satellite (GOES), 63, 64f

Geotail, 80
RCM and, 222, 222f
STICS of, 83

Gérard, J.-C., 343
Gerrard, A., 148, 149

Global ionosphere and thermosphere model (GITM), 62, 205–12, 207f, 208f, 209f, 210f, 211f

Global Scale Wave Model (GSWM), 64

Glocer, A., 102, 190, 196, 361

GOCE. See Gravity Field and Steady State Ocean Circulation
Explorer

GOES. See Geostationary Operational Environmental Satellite

GPW. See Generalized Polar Wind

Gravity Field and Steady State Ocean Circulation Explorer
(GOCE), 238, 239f

Grebowsky, J. M., 6
Greer, M. S., 62

Grodent, D. J., 336, 343

GSM. See Geocentric Solar Magnetospheric
GSWM. See Global Scale Wave Model

Gu, X., 283

GUMICS, 195

Gurgiolo, C., 4

Gurnett, D. A., 12, 284, 323

H+, 3, 102, 109, 216, 358

Classical Polar Wind and, 171–72
in magnetosphere, 110
multifluid MHD for, 111
O+ and, 79–80
parallel ion velocity of, 94, 95f
parallel ion velocity of, 94, 95f
polar cap and, 172, 173f
polar wind and, 22–24, 23f, 25f, 96, 175
substorms and, 82
suprathermal outflow of, 27–29, 29f

Hall conductivity, 71, 71f
Halloween storms, 61, 62, 73–75
Hamilton, D. C., 146
Hansen, C. J., 347

HAO. See High Altitude Observatory

Harang discontinuity, 12

Hasegawa, A., 4

He+, 3
L-shells and, 151
parallel ion velocity of, 94, 95f
plasmasphere and, 358
polar wind ion observations of, 22, 23f
substorms and, 82

He++, in magnetosphere, 102

Hedman, M. M., 347–48
Heelis, R. A., 52, 206

HEIDI. See Hot Electron and Ion Drift Integrator
Helicon waves, 80

Hesse, M., 84

HF. See High-frequency radar

HFR. See High Frequency Receiver

High Altitude Observatory (HAO), 63
High-frequency (HF) radar, 51, 366
High Frequency Receiver (HFR), 37, 129f, 278
High Performance Capillary Electrophoresis (HPCE), 81

Hill, T. W., 251, 311

Hines, C. O., 49

Hoch, R. J., 4

Hoffman, J. H., 34

Hospodarsky, G. B., 279, 280, 281
Hot Electron and Ion Drift Integrator (HEIDI), 209
Hot plasma analyzer (HPA), 364

Howarth, A., 45
HPA. See Hot plasma analyzer

HPCE. See High Performance Capillary Electrophoresis

Hubble Space Telescope (HST)

Jupiter and, 250, 250f
Saturn and, 251, 312, 336

HWMO7, 237–38, 239, 239f
HWMO14, 239f
HWMO93, 237–38, 237f, 239, 239f

Hybrid model of the magnetosphere (HYPERS), 176

IBEX. See Interstellar Boundary Explorer

ICME. See Interplanetary coronal mass ejections

Ilie, R., 102

Imager for Magnetopause-to-Aurora Global Explorer
(IMAGE), 6–7, 155
for conjugate aurora, 227–33, 229f, 230f, 231f
conjugate aurora and, 227, 229f
Dawn-Dusk Offset by, 229–30
EUV and, 235
FUV of, 158
neutral polar wind and, 175
SWMF and, 228–29

IMF. See Interplanetary magnetic field

Incoherent scatter radar (ISR), 359, 366–68, 367f
Injection-dispersion structures, of Saturn, 312–15, 312f, 313f,
314f, 315f

INMS. See Ion and Neutral Mass Spectrometer

Inner magnetosphere

EMIC in, 155–64, 159f, 160f, 162f, 163f
plasmapause and, 310
plasma waves in, 155–64, 159f, 160f, 162f, 163f
RCM and, 217
of Saturn, 278, 280, 345, 346
whistler-mode emissions in, 155–64, 159f, 160f, 162f, 163f
International Sun-Earth Explorer (ISEE), 80, 82
Interplanetary coronal mass ejections (ICME), 260
Interplanetary magnetic field (IMF), 7, 24
ACE and, 64, 206, 220f
anti-sunward component of, 50, 50f, 52–53
boundary layer and, 53f
Classical Polar Wind and, 171, 171f
conjugate aurora and, 227
convection and, 42
cusp and, 50
gemagnetic field and, 52
ionspheric convection and, 50–51, 51f
lobe cells and, 232
Lorentz force and, 247
in magnetosheath, 52
northward component of, 51–52, 51f, 53, 53f
multifluid MHD and, 104
multi-species MHD and, 104
solar wind in, 103, 104f, 110
central plasma sheet and, 101
multifluid MHD and, 110
multispecies MHD and, 104
RCM and, 220
Saturn solar wind and, 322
sunward component of, 50, 50f
Interplanetary shocks
Saturn and, 329, 330f
solar wind and, 260
Interstellar Boundary Explorer (IBEX), 270
Io, 269, 269f
Ioannidis, G. A., 309–10
Ion and Neutral Mass Spectrometer (INMS), 267, 268, 293, 294, 300, 300f
Ionopause
of Pluto, 270
of Venus, 248, 265
Ionosphere. See also Magnetosphere-ionosphere coupling
auroral, 24, 358, 362, 366
convection in
anti-sunward component of, 52–53
in cusp, 53, 54f
at high altitudes, 49–57
IMF and, 50–51, 51f
ionspheric effects of, 56–57
magnetometer and, 50–51
merging of, 52–53, 55f
observations and interpretation of, 52–53
spatial and temporal variations in, 53–56
thermosphere and, 56–57
DC electromagnetic energy flux in, 363
defined, 365
D-region of, 62
electron density in, 210, 211
E-region of, 62
F-region and, 365
Joule heat energy on, 66–68, 67f
magnetospheric ion density and temperature and, 101–11, 104f, 105f, 106f, 107f, 108f, 109f
of Mars, 263, 266f
MEPED and, 68–72, 71f
in RCM, 311
SEP and, 68–72
solar wind and, 196
of Titan, 267, 299–300
of Venus, 265
Ionosphere-Plasmasphere-Polar Wind (IPPW), 176
Ion outflows, 11–12
in active time, 97–98
measurement from ionosphere, 21–29, 22f
in MHD, 103
M-I coupling and, 169–76, 170f, 171f, 172f, 173f, 174f, 175f, 176f
simulation setup for, 181–82
polar cap and, 91–99
in quiet time, 151f, 152
GPW and, 190
polar wind and, 92–97, 93f, 95f, 96f
of Titan, 294–96, 295f, 297f–298f
transverse heating and, 197
Io Plasma Torus (IPT), 250–51
IPT. See Io Plasma Torus
IRI-1990, 216
ISEE. See International Sun-Earth Explorer
ISIS-2, 22
ISR. See Incoherent scatter radar
Jackman, C. H., 63
Jia, X., 322, 325, 328, 330, 337, 342, 350
Johnson, R. E., 310
Jordanova, V. K., 157, 158, 160–61
Joule heating, 61, 362, 363
Dst index and, 66, 68f
effects on ionosphere and thermosphere of, 66–68, 67f
gemagnetic storms and, 64, 66–68
highest levels of, 66
Pedersen conductivity and, 70, 71f
JUICE Mission, 269, 270
Jun, 251
Jupiter
auroral oval of, 253
magnetopause of, 251
magnetosphere of, 251
M-I coupling at, 25f, 250–51, 250f, 309–16, 310f, 311f, 312f, 313f, 314f, 315f, 316f
moons of, 269–70
plasmapause of, 310, 310f
plasmasphere drainage plumes and, 7
radio emissions from, 4
RCM for, 310–11
X-ray emissions from, 250–51, 250f, 251f
Kaguya, 270
Kaiser, M. L., 12
Kan, J. R., 83
Kelvin-Helmholtz vortices (K-H), 312, 335, 336, 337, 339, 342, 343
Khazanov, G., 92, 94
Khurana, K. K., 327
Kidder, A., 320, 328
K index, 359
Kistler, L. M., 81, 84, 85
Kitamura, N., 92, 94, 97–98
Kivelson, M. G., 245, 322, 325
Knight, S., 249, 312
Kozyra, J. U., 4
Krall, J. J., 235, 236, 237, 238
Kronian plasma, 336
Lakhina, G. S., 80
Langmuir Probe (LP), 294, 373
Langmuir waves, of Saturn, 277, 278, 282, 283, 284f
LANL. See Los Alamos National Laboratory
Laundal, K. M., 55
Leblanc, M., 263
Ledvina, S. A., 293
Lee, L. C., 12, 83
Leisner, J. S., 279
Lemaire, J., 21–22
Lennartsson, O. W., 79, 81, 82, 83
LFM. See Lyon-Fedder-Mobarry
LHR. See Lower Hybrid Resonance
Li, K., 37, 39, 41, 42, 43, 45
Li, W., 132, 133
Liao, J., 85, 86
Liou, K., 228
Liu, X., 311
Liu, Y. H., 84, 85
Lobe cells, 232
Local time (LT), 69. See also Magnetic local time
L-shells and, 325
of Saturn, 281, 312, 323
SKR and, 324–25
Lockheed Palo Alto group, 358–59
Lockwood, M., 53, 57
López-Puertas, M., 74
Lorentz force, 247
Los Alamos National Laboratory (LANL), 158
Loss cone, 8, 12, 13f, 97, 228, 249
Lower Hybrid Resonance (LHR), 364
LP. See Langmuir Probe
L-shells, 80
Enceladus and, 353f
He+ and, 151
LT and, 325
O+ and, 151
RBSPICE of, 147–50, 147f, 148f
LT. See Local time
Luhmann, J. G., 248, 260
Lummerzheim, D., 69
Lundin, R., 263
Lybekk, B., 36
Lynch, K. A., 12
Lyon-Fedder-Mobarry (LFM), 195, 228–29
Magnetic field
of comets, 261
cusp and, 359
IMF and, 52
of magnetosphere, 218–19, 246
in MHD, 248
mirror ratio for, 249
plasmas and, 309
of Titan, 253–54
Magnetic Field Probe (MFP), 364
Magnetic flux
Enceladus and, 346
magnetic reconnection and, 249
polar cap boundary and, 55–56
Magnetic latitude (MLAT), 70
Magnetic local time (MLT), 24, 26, 26f, 83
chorus waves and, 156
conjugate aurora and, 228
EMIC and, 156
cap and, 93–94
processes and features of, 171f
QP whistler-mode emissions and, 138
Van Allen Probes and, 127–28
Magnetic Multiscale Mission (MMS), 249
Magnetic reconnection
in plasmas, 249
in Saturn, 336
Magnetodisk, of Saturn, 267
Magnetohydrodynamics (MHD), 52, 101
Alfvénic waves in, 249–50
BATS-R-US and, 180, 198
BBF and, 221
CME and, 227
conjugate aurora and, 227
CPCP and, 188, 189f, 190
fluid models for, 175–76
GPW and, 181
GSM and, 186, 187f, 189f
ion outflow in, 103
magnetic field in, 248
M-I coupling and, 247–50
multifluid, 102, 104, 110, 111
on O+, 80
passive inner boundary condition for, 102
for plasma sheet, 102
plasmoids and, 187
polar wind and, 179–91, 182f, 183f, 184f, 185f, 186f, 187f,
188f, 189f
RCM and, 311
for Saturn, 253
magnetosphere of, 335–44, 337f, 338f, 339f, 340f,
341f, 342f
Magnetohydrodynamics (MHD) (cont’d)

M-I coupling and, 319–31, 322f, 323f, 324f, 325f, 326f, 327f, 329f, 330f
SCB and, 157
theory of, 247–48
for Titan, 253, 293
WPI and, 196–99

Magnetometer
of Cassini, 279, 279f, 293
in EMPFISIS, 128, 160
ionospheric convection and, 50–51
of SuperDARN, 368
SWMF and, 182

Magnetopause, 120, 186, 246
of Jupiter, 251
of Saturn, 320, 323, 325, 325f, 337, 339

Magnetosheath, 52
of Saturn, 253, 267, 336
of Venus, 265

Magnetosonic equatorial emissions, 133–35, 136f–137f
Magnetosonic waves, 118, 118f

Magnetosphere. See also Inner magnetosphere
boundary layer of, 52
cold ions to, 41–42, 42f
convection in, in ion outflows in active time, 98
cusp and, 52
Earth-like interactions in, 246, 246f
of Enceladus, 268
He++ in, 102
H+ in, 110
ion density and temperature of
ionosphere and, 101–11, 104f, 105f, 106f, 107f, 108f, 109f
solar wind and, 101–11, 104f, 105f, 106f, 107f, 108f, 109f
of Jupiter, 251
magnetic field of, 218–19, 246
model performance of, for conjugate aurora, 227–33
O+ in, 175–76, 196
plasmasphere and, 235
of Saturn, 251–52, 261, 267
Enceladus plume and, 346–50
Enceladus torus and, 345–53, 346f, 347f, 348f, 348t, 349f, 350f, 351f, 352f
MHD for, 335–44, 337f, 338f, 339f, 340f, 341f, 342f
M-I coupling simulations for, 335–44, 337f, 338f, 339f, 340f, 341f, 342f
Titan and, 291–302, 292f, 293t, 294f, 295f, 296f, 297f, 298f, 299f, 300f, 301f
solar wind and, 52, 102, 118, 246, 309–10, 358
transverse heating and, 197
waves in, 118f

Magnetosphere-ionosphere coupling (M-I coupling)
future capabilities for, 13–16
from ion outflows, 169–76, 170f, 171f, 172f, 173f, 174f, 175f, 176f
simulation setup for, 181–82
at Jupiter, 25f, 250–51, 250f, 309–16, 310f, 311f, 312f, 313f, 314f, 315f, 316f
MHD and, 247–50
past to future, 3–15

at planets and satellites, 245–54, 246f, 247f, 249f, 250f, 251f, 252f, 254f
plasmas and, 245
RCM and, 311
at Saturn, 251–53, 252f, 309–16, 310f, 311f, 312f, 313f, 314f, 315f, 316f
MHD for, 319–31, 322f, 323f, 324f, 325f, 326f, 327f, 329f, 330f
at Titan, 253–54, 254f
WPI transverse heating and, 195–201, 198f, 199f, 200f
Magnetosphere-ionosphere-thermosphere system, energetic and dynamic coupling of, 61–75
data and model description for, 62–64
results on, 64–74

Magnetospheric Imaging Instrument (MIMI), 252–53, 293
Magnetospheric Ion Composition Spectrometer (MICS), 146
Magnetospheric Multiscale (MMS), 15
Magnetospheric O+, PWOM and, 102
Magnetospheric precipitation, 74
of Titan, 296–300, 298f, 299f
Magnetotail, 101–11, 176, 176f, 187, 261
magnetic reconnection and, 249
O+ and, 79–88
Mapped flux, 37
Mars, 263–64, 265f
exosphere of, 263
ionosphere of, 263, 266f
Mars Express, 263, 265f
Mass-loading, 247–48
exospheres and, 247
of Pluto, 270
MAVEN, 263, 358
Maxwellian distribution function, 63–64
McAndrews, H. J., 342
MCP. See Microchannel plate
Medium Energy Proton and Electron Detector (MEPED), 62–63, 65f
atmosphere and, 72–74, 72f
ionosphere and, 68–72, 71f
NCAR-TIMEGCM and, 72, 72f
SEP and, 66
Melin, H., 347
Menietti, J. D., 12, 281, 283, 300–301
MEPED. See Medium Energy Proton and Electron Detector
Mercury, 310, 310f
Meredith, N. P., 156
Merging, 52–53, 55f
MFP. See Magnetic Field Probe
MHD. See Magnetohydrodynamics
Michelson Interferometer for Passive Atmospheric Sounding (MIPAS), 74
M-I coupling. See Magnetosphere-ionosphere coupling
Microchannel plate (MCP), 146
MICS. See Magnetospheric Ion Composition Spectrometer
Milan, S. E., 55
MIMI. See Magnetospheric Imaging Instrument
MIPAS. See Michelson Interferometer for Passive Atmospheric Sounding
MIRACLE, 368
Index 387

Mirror ratio, 249
Mitchell, D., 146
Mitchell, D. G., 321
MLAT. See Magnetic latitude
MLT. See Magnetic local time
MMS. See Magnetic Multiscale Mission; Magnetospheric Multiscale
Moon (Earth’s), 270, 270f
Moore, T., 191
Moore, T. E., 97, 101
Morley, S. K., 57
Mouikis, C. G., 82
MS. See Equatorial magnetosonic waves
MSIS 90, 216
Multifluid MHD, 102
for H+, 111
IMF and
northward component of, 104
southward component of, 110
Multi-species MHD, 102, 104

N/O ratio. See Neutral mass density
Nagy, A. F., 245
Nanograins, 252, 268
Narrowband emissions, 283
National Aeronautics and Space Administration (NASA), 156.
See also Cassini
IMAGE of, 6–7, 155
for conjugate aurora, 227–33, 229f, 230f, 231t
conjugate aurora and, 227, 229f
Dawn-Dusk Offset by, 229–30
EUV and, 235
FUV of, 158
neutral polar wind and, 175
SWMF and, 228–29
Juno of, 251
Magnetic Multiscale Mission of, 249
Small Explorer of, 375
THEMIS of, 8f, 120, 132, 133, 367, 368–69, 373, 374f
Van Allen Probes of, 120
chorus waves and, 129–32, 131f
EMIC and, 156
plasma wave measurements from, 127–38
RBPICE on, 145–53
National Center for Atmospheric Research - Thermosphere Ionosphere Mesosphere Electrodynamics General Circulation Model (NCAR-TIMEGCM), 61, 62, 64, 72, 72f
National Center for Environmental Predictions (NCEP), 64
National Oceanic and Atmospheric Administration (NOAA), 62.
See also Polar Orbiting Environment Satellite
NCAR-TIMEGCM. See National Center for Atmospheric Research - Thermosphere Ionosphere Mesosphere Electrodynamics General Circulation Model
NCEP. See National Center for Environmental Predictions
Neutral mass density (N/O ratio), 66–67
Neutral polar wind, 169, 175, 175f
Newell, P. T., 228
New Horizons, 259, 270
Nichols, J. D., 336, 342
Nilsson, H., 42
NOAA. See National Oceanic and Atmospheric Administration
Non-magnetic solar system bodies
Dione as, 268
Enceladus as, 268–69
escape rates for, 269, 271, 271f
Mars as, 263–64, 265f
Moon as, 270, 270f
plasma measurements at, 259–71, 261f, 261t, 262f, 264f, 265f, 266f, 267f, 270f, 271f
Pluto as, 270
Rhea as, 268
Titan as, 253–54, 254f, 267–68
upstream conditions for, 259–60
Venus as, 265–67
Nosé, M., 83
NRLMSISE00, 236

O+, 3
Alfvén-wave acceleration and, 79
in auroral ionosphere, 24
Classical Polar Wind and, 171–72
cross-tail electric field and, 175
current sheet and, 85–86, 85f, 86f
EMIC and, 196
EUV and, 79
GPW and, 174
gyroradius of, 79
H+ and, 79–80
ion outflow of, 11
in ion outflows in active time, 98
kinetic energy of, 362
linear ion tearing from, 80
on loading, 83–84
L-shells and, 151
in magnetosphere, 175–76, 196
magnetotail dynamics and, 79–88
timing of, 81
MHD on, 80
parallel ion velocity of, 94, 95f, 96f
plasma sheet and, 102
polar cap and, 96, 172, 172f
polar wind and, 22–24, 23f, 25f, 41, 92, 175
in RCM, 216
substorms from, 81–84, 82f, 84f
suprathermal outflow of, 27–29, 29f
SZA and, 94, 96, 96f
tail reconnection rate and, 84–85, 87f, 88f
transport of, 79–80
of Venus, 265
O3. See Ozone
Ogawa, Y., 26, 27
OGO-5, 6
O+/H+ density ratio, 82f, 83–84, 84f, 98, 174
Ono, Y., 83
Open Geospace General Circulation Model (OpenGGCM), 195, 227, 228, 229
Oøstgaard, N., 228
Ouellette, J. E., 191
Ozak, N., 251
Ozone (O₃), 61, 72–74
Parallel ion velocities, 94, 95f, 96f
Saturn and, 323f, 338–39, 341f, 342
Particle in cell (PIC), 84, 174, 181
Pedersen conductivity, 70, 71, 71f
Peroomian, V., 102
Persoon, A. M., 283
Peterson, W. K., 29
Petrinec, S. M., 84
Peymirat, C., 50
PFISR. See Poker Flat Incoherent Scatter Radar
Photoelectrons, 92, 268
of Mars, 263
of Venus, 265
PIC. See Particle in cell
Pickup ions
comets and, 261–63, 261f, 262f
of Enceladus, 268
of Io, 269, 269f
of Moon, 270, 270f
of Pluto, 270
of Venus, 265
Pickup protons, of Mars, 263
Pickup water, of comets, 262–63, 262f
Pilkington, N., 325
Pioneer, 12, 321, 345
Pioneer Venus Orbiter (PVO), 246, 247f, 265
Piša, D., 283
Pitch-angle, 198, 249, 261, 269
Plasma flows
in auroral zone, 50
flux transfer events in, 53
Plasma packets, 56, 56f
Plasmapause, 310, 310f
Plasmas
CPA and, 371
electrical current of, 248, 249f
of Enceladus, 269
kinetic description of, 247
magnetic fields and, 309
magnetic reconnection in, 249
measurements of, at non-magnetic solar system bodies, 259–71, 261f, 261t, 262f, 264f, 265f, 266f, 267f, 270f, 271f
M-I coupling and, 245
Plasma sheet
central, 52, 101
cross-tail electric field and, 110
flux tubes, as blobs and bubbles, 221
H⁺ and, 102, 109
MHD for, 102
O⁺ and, 102, 175
RCM and, 217–18, 221
of Saturn, 325, 327, 327f
classical Polar Wind, 169, 170–72, 171f, 172f
PWOM and, 180
cleft ion fountain and, 91–99
GPW, 169, 172–75, 360
BATS-R-US and, 179
CPAC and, 188, 189f, 190–91
Dst index and, 186
fluid/particle hybrid model for, 180–81
global simulations of, 174–75, 174f
of Jupiter, 251
MLT and, 93–94
O⁺ and, 96, 172, 172f
thermal outflows and, 91–99
Polar cap boundary (PCB), 55–56, 227, 228, 229, 230f, 232
Polar cap potential (PCP), 65–66, 217. See also Cross polar cap potential
Polar Orbiting Environment Satellite (POES), 62–63, 119, 120, 132
Polar rain, 33, 173f, 174, 181
Polar wind, 22–23, 23f, 25f, 359
Classical Polar Wind, 169, 170–72, 171f, 172f
PWOM and, 180
cleft ion fountain and, 91–99
GPW, 169, 172–75, 360
BATS-R-US and, 179
CPAC and, 188, 189f, 190–91
Dst index and, 186
fluid/particle hybrid model for, 180–81
global simulations of, 174–75, 174f
Plasmasphere
chorus waves in, 156
drainage plumes, 5–7, 6f, 7f
EMIC and, 117
EUV and, 235
F-region and, 358
in geomagnetic storms, 235
magnetosphere and, 235
plasmaspheric hiss and, 117
plumes of, 358
in quiet-time, thermospheric winds and, 235–39
SAM13 and, 236–38, 238f
Plasmaspheric hiss, 117, 118, 118f, 132–33, 134f
long-term relativistic electron decay by, 121–22
loss processes of, 158
origin and global distribution of, 119
Plasma wave and sounder (PWS), 93
Plasma waves
of Cassini at Saturn, 277–85, 278f, 279f, 280f, 281f, 284f
FAST and, 360f
in inner magnetosphere, 155–64, 159f, 160f, 162f, 163f
measurements of, from Van Allen Probes, 127–38
Plasmoids, 187, 189f, 337
Pluto, 259, 270
POES. See Polar Orbiting Environment Satellite
Poker Flat Incoherent Scatter Radar (PFISR), 205–6, 211, 211f, 369
POLAR, 21, 22, 24
for conjugate aurora, 227–33, 229f, 230f, 231t
Dawn-Dusk Offset by, 229–30
SWMF and, 228–29
Polar cap
convection in, 94
H⁺ and, 172, 173f
IMF and, 50, 50f, 54f
ion outflows and, 91–99
of Jupiter, 251
MLT and, 93–94
O⁺ and, 96, 172, 172f
thermal outflows and, 91–99
Polar cap boundary (PCB), 55–56, 227, 228, 229, 230f, 232
Polar cap potential (PCP), 65–66, 217. See also Cross polar cap potential
Polar Orbiting Environment Satellite (POES), 62–63, 119, 120, 132
Polar rain, 33, 173f, 174, 181
Polar wind, 22–23, 23f, 25f, 359
Classical Polar Wind, 169, 170–72, 171f, 172f
PWOM and, 180
cleft ion fountain and, 91–99
GPW, 169, 172–75, 360
BATS-R-US and, 179
CPAC and, 188, 189f, 190–91
Dst index and, 186
fluid/particle hybrid model for, 180–81
global simulations of, 174–75, 174f
ion outflows in quiet time and, 190
MHD and, 181
UT and, 182
H+ and, 96, 175
IMF and, 38–39
ion outflows and
in active time, 98
in quiet time, 92–97, 93f, 95f, 96f
IPPW, 176
of Mars, 263
MHD and, 179–91, 182f, 183f, 184f, 185f, 186f, 187f, 188f, 189f
neutral, 169, 175, 175f
O+ and, 92, 175
photoelectrons and, 92
solar irradiance and, 39–41, 41f
Polar wind outflow model (PWOM), 102, 180, 181, 182, 186, 360
CPCP and, 188, 189f
magnetotail dynamics and, 187
Pontius, D. H., Jr., 221
Poynting flux, 12, 12f, 44, 369–80
Poynting vectors, 128, 277, 282
Proton cyclotron waves, 128, 263, 265
Proton flux, 146, 158
Pu, Z. Y., 84
Pulkkinen, A., 229
PVO. See Pioneer Venus Orbiter
PWOM. See Polar wind outflow model
PWS. See Plasma wave and sounder
Qian, L., 64, 66
QP. See Quasi-periodic
Quasi-neutrality, ambipolar electric field and, 359
Quasi-periodic (QP)
chorus waves, 132
magnetosonic equatorial emissions and, 135
whistler-mode emissions, 127, 135, 138
of Saturn, 280
Quiet time
ion outflows in, 151f, 152
GPW and, 190
polar wind and, 92–97, 93f, 95f, 96f
plasmasphere in, thermospheric winds and, 235–39, 236f, 237f, 238f, 239f
Radiation Belt Storm Probe Ion Composition Experiment (RBSPICE)
Dst index and, 148–49, 148f, 149f
instruments of, 146
of L-shells, 147–50, 147f, 148f
for ring current, 145–53
spatial observations by, 150–51, 150f, 151f
on Van Allen Probes, 145–53
Radiations Belt Storm Probes (RBSP), 127
chorus waves and, 130
lightning whistlers and, 129
magnetosonic equatorial emissions and, 133–35
plasmaspheric hiss and, 133
QP whistler-mode emissions and, 138
Radio and Plasma Wave Science (RPWS), 277, 278–79, 278f, 279f, 283
Enceladus and, 350, 351f
RAM-SCB. See Ring current-atmosphere interactions model with self-consistent magnetic field
Rapid Atmospheric Neutral Gas Experiment (RANGE), 364, 373, 374f
RBSP. See Radiations Belt Storm Probes
RBSPICE. See Radiation Belt Storm Probe Ion Composition Experiment
RCM. See Rice Convection Model
Reconnection, 53
in Jupiter, 251
in plasmas, 249
in Saturn, 336
REdline Geospace Observatory (REGO), 368
Redmon, R. J., 24
REGO. See REdline Geospace Observatory
Retterer, J. M., 197
Reversal boundary
auroral precipitation and, 52, 52f
shear flows and, 50
Rhea, 268
whistler-mode emissions of, 282
Rice Convection Model (RCM), 215–23, 219f, 220f, 221f, 222f, 223f
Birkeland current and, 216, 218f
Geotail and, 222, 222f
IMF and, 218
southward component of, 220
for Jupiter, 310–11
logic and formulation of, 216, 217f
MHD and, 311
M-I coupling and, 311
original model of
latent defects and partial resolution of, 221–22
rights and wrongs of, 217–21
plasma sheet in, 217–18, 221
for Saturn, 310–16, 314f, 315f, 316f
Richards, P. G., 97
Richardson, J. D., 320
Ridley, A. J., 69, 102, 157, 190–91
Ridley Ionosphere Model (RIM), 180, 181, 182
Ring current, 7–9, 8f, 9f
kinetic model of, 157–58
RBSPICE for, 145–53
Ring current-atmosphere interactions model
with self-consistent magnetic field (RAM-SCB), 155
EMFISIS and, 160, 160f
EMIC and, 158
loss cone in, 158
MHD and, 157
Roble, R. G., 69
Rosetta, 263, 270
Rothwell, P. L., 80
RPWS. See Radio and Plasma Wave Science
Russell, C. T., 53, 84, 245, 248
Rymer, A. M., 293
Saturn

Saturn kilometric radiation (SKR), 12–13, 14f, 277, 279, 284, 301f, 302, 319
Cassini and, 321
LT and, 324–25
Saturn Orbit Insertion (SOI), 282
Sawtooth event, 14, 15f, 85
Scanning Imaging Absorption Spectrometer for Atmospheric Chartography (SCIAMACHY), 74
SCB. See Spacecraft B
Scherless, L., 218
Schield, M. A., 215, 217
Schippers, P., 313
Schunk, R. W., 171, 174, 175, 181, 196–97, 245, 361
SCIAMACHY. See Scanning Imaging Absorption Spectrometer for Atmospheric Chartography
SED. See Saturn Electrostatic Discharges; Storm-enhanced densities
SEE. See Solar EUV Experiment
SEM-2. See Space Environment Monitor
SEP. See Solar energetic protons
Sharp, R. D., 11, 81
Shay, M. A., 84
Shear flows, reversal boundary and, 50
Shelley, E. G., 11, 82
Simon, S., 293
Singer, S. Fred, 146
Single-fluid MHD, 102
Single Value Decomposition (SVD), 128, 129f
Siscoe, G. L., 310
Skjæveland, A., 53
SKR. See Saturn kilometric radiation
Small Explorer, 375
Smith, A. J., 135
Smith, C. G. A., 321
Sojka, J. J., 171, 172, 361
Solar Cycle, 22
Solar energetic protons (SEP), 61, 62, 63, 65f
atmosphere and, 72–74, 73f
Halloween storms and, 74
ionosphere and, 68–72
MEPED and, 66
Pedersen conductivity and, 71
Solar EUV Experiment (SEE), 64
Solar Weather Modeling Framework (SWMF), 195
Solar wind
from ACE, 206
atmosphere and, 358
auroral ionosphere and, 358
bulk speed of, 64, 65f
comets and, 246–47, 263, 264f
conjugate aurora and, 228, 229
IMF and, 229
in IMF northward component, 103, 104f, 110
ionosphere and, 196
magnetic flux and, 55
magnetopause and, 120
magnetosphere and, 52, 102, 118, 246, 309–10, 358
ion density and temperature of, 101–11, 104f, 105f, 106f,
107f, 108f, 109f
MHD and, 180
plasma sheet and, 102, 109, 218–19
of Pluto, 270
of Saturn, 267, 319, 327–30, 329f, 336
IMF southward component and, 322
solar system bodies and, 245–46
Titan and, 253
varied conditions of, 260
Venus and, 246–47, 247f, 265
Solar zenith angle (SZA), 94, 96, 96f, 267
Sotirelis, T., 39, 43t
Southwood, D. J., 321, 325
Spacecraft B (SCB), 128, 130, 132
Space Environment Monitor (SEM‐2), 62, 63
Space Weather Modeling Framework (SWMF), 102–3, 181,
182, 228–29
Spasojević, M., 9
SPICAM, 263
Spiro, R. W., 218
SSC. See Storm sudden commencement
Stable auroral red arcs (SAR arcs), 4, 5f
STICS. See Supra‐Thermal Ion Composition Spectrometer
Stone, R. G., 12
Storm‐enhanced densities (SED), 169
plume of 24 to 25 October, 2011, 205–12, 207f, 208f, 209f,
210f, 211f
Storm sudden commencement (SSC), 64, 186
Strangeway, R. J., 102, 361
Stubbs, T. J., 228
Su, Y.-J., 34, 42, 92, 97
Substorms, 81–84, 82f, 84f, 175. See also Time History of
Events and Macroscale Interactions during Substorms
Sundberg, K. Å. T., 52
Super Dual Auroral Radar Network (SuperDARN), 63, 366
convection and, 368–69
magnetometers of, 368
SED plume of 24 to 25 October, 2011 and, 205–6
SuperMAG, 368
Supra‐Thermal Ion Composition Spectrometer (STICS), 83
Suprathermal ion mass spectrometer (SMS), 92, 94
Suprathermal outflows, 27–29, 29f
SVD. See Single Value Decomposition
Svensen, K. R., 40
Swisdak, M., 84
SWMF. See Solar Weather Modeling Framework; Space
Weather Modeling Framework
Sym‐H index, 206
SZA. See Solar zenith angle
TAD. See Traveling atmospheric disturbances
TAI. See Transversely accelerated ions
Tam, S. W. Y., 92
Tao, X., 282–83
TDIM. See Time Dependent Ionospheric Model
TEC. See Total electron content
TED. See Total Energy Detector
Terrestrial kilometric radiation (TKR), 4
THEMIS. See Time History of Events and Macroscale
Interactions during Substorms
Thermal plasma density control, 117–22
Thermosphere, 56–57, 359
Joule heat energy on, 66–68, 67f
Thermosphere Ionosphere Mesosphere Electrodynamics
General Circulation Model (TIMEGCM), 236, 237, 237f
AMIE and, 239
Thermosphere‐ionosphere‐mesosphere energetics and
dynamics (TIMED), 64
Thermospheric winds, quiet‐time plasmasphere and, 235–39,
236f, 237f, 238f, 239f
Thomsen, M. F., 328
TIIS. See Titan Interaction system
TIMED. See Thermosphere‐ionosphere‐mesosphere energetics
and dynamics
Time Dependent Ionospheric Model (TDIM), 208
TIMEGCM. See Thermosphere Ionosphere Mesosphere
Electrodynamics General Circulation Model
Time History of Events and Macroscale Interactions during
Substorms (THEMIS), 8f, 120, 132, 133, 367, 368–69,
373, 374f
Time‐of‐flight by energy (TOFxE), 146
Titan, 267–68
atmosphere of, 253
ENA of, 299
EUV of, 301f
ionosphere of, 267, 299–300
ion outflows of, 294–96, 295f, 297f–298f
magnetic field of, 253–54
magnetospheric precipitation of, 296–300, 298f, 299f
MHD for, 253, 293
M-I coupling at, 253–54, 254f
plasma sheet of, 292
Saturn magnetosphere and, 291–302, 292f, 293t, 294f, 295f,
296f, 297f, 298f, 299f, 300f, 301f
Titan Interaction system (TIIS), 296
TKR. See Terrestrial kilometric radiation
TOFxE. See Time‐of‐flight by energy
TOFxPH. See TOF x pulse height
TOF x pulse height (TOFxPH), 146
Torr, D. G., 97
Total electron content (TEC), 205
in GITM, 206–11
PFISR and, 206, 211f
time history of, 207–9, 209f
Total Energy Detector (TED), 63
Transverse heating, 195–201, 198f, 199f, 200f
Transversely accelerated ions (TAI), 21
Traveling atmospheric disturbances (TAD), 67–68
Tsurutani, B. T., 80
UFI. See Upflowing ions
UHR. See Upper hybrid resonance
ULF. See Ultra low frequency
Ultra low frequency (ULF), 118, 363, 370
EMIC, 156
Ultraviolet (UV), 61
- cold ion detection challenge and, 35
- GPW and, 181
- of Titan, 293

Ultraviolet Imaging Spectrograph (UVIS), 312

Universal Time (UT), 182
- Classical Polar Wind and, 171
- of Saturn, 280
- SED of 24 to 25 October, 2011 and, 207–8

Upflowing ions (UFI), 27
- chorus waves and, 132
- QP whistler-mode emissions and, 138
- of Saturn, 277, 278, 279, 282–83

Upwelling ions (UWI), 21
- UT. See Universal Time
- UV. See Ultraviolet
- UVIS. See Ultraviolet Imaging Spectrograph
- UWI. See Upwelling ions

Vaisberg, O., 248

Van Allen Probes, 120
- chorus waves and, 129–32, 131f
- EMIC and, 156
- plasma wave measurements from, 127–38
- RBSPICE on, 145–53

Van Allen radiation belts
- chorus waves in, 132
- plasmaspheric hiss and, 132–33
- plasma waves in, 127

Vasyliunas, V. M., 3, 217

Velocity filter effect, 80

Venus
- ionopause of, 248, 265
- as non-magnetic solar system body, 265–67
- solar wind and, 246–47, 247f, 265

Venus Express, 265

Very low frequency (VLF), 156, 370, 371

Viking, 21, 365

Viscous-like interaction, 53, 53f

VISIONS, 371

VLF. See Very low frequency

Volland, H., 50

Voyager, 12, 278
- Saturn and, 283, 284, 321, 345
- Titan and, 253, 296

Wahlund, 366

Walker, R., 102

Walker, R. J., 337, 342

Walsh, B. M., 45

Wang, Z., 283

Watanabe, S., 93

Water
- on Enceladus, 252, 268, 310
- pickup water, of comets, 262–63, 262f

WATS, 238

Waveform receiver (WFR), 128, 277
- chorus waves and, 130, 131
- magnetosonic equatorial emissions and, 135
- plasmaspheric hiss and, 133

Wave-Particle Interactions (WPI), 174, 181
- MHD and, 196–99
- from transverse heating, M-I coupling and, 195–201, 198f, 199f, 200f

WBR. See Wideband receiver

Wei, H. Y., 300

Weimer, D., 206

Welling, D. T., 102, 103, 180, 190, 191, 196

Westlake, J. H., 253, 294

WFR. See Waveform receiver

Whistler-mode emissions, 117–22. See also Chorus waves;
- Plasmaspheric hiss
- in inner magnetosphere, 155–64, 159f, 160f, 162f, 163f
- from lightning, 128–29, 130f
- origin and global distribution of, 118–19
- QP, 127, 135, 138
- of Rhea, 282
- of Saturn, 278, 279–82, 280f, 281f

Wideband receiver (WBR), 278

Williamson, J. M., 146

Wilson, G. R., 92, 94, 97

Wiltberger, M., 80, 102

WINDII, 238

Winglee, R. M., 102, 196

Wolf, R. A., 6, 7, 217, 221

World Wide Lightning Location Network (WWLLN), 129

WPI. See Wave-Particle Interactions

Wu, C. S., 12

WWLLN. See World Wide Lightning Location Network

X-ray emissions, from Jupiter, 250–51, 250f, 251f

Yau, A. W., 24, 34, 45

Ye, S.-Y., 283

Yelle, R. V., 300

Yosemite Conference on Magnetosphere-Ionosphere
- Coupling, 3, 15, 357

Yu, Y., 190–91

Zaharia, S., 190

Zelenyi, L. M., 85

Zheng, H., 129

Zhou, Q., 135

Zieger, B., 327–28, 330

Zou, S., 206, 211