

# Index

## A

absorption cross section, 121  
accretion  
  columns, 165–168  
  disk, 156, 162, 165, 167  
adaptive mesh refinement, 142, 183, 202, 203  
ADQL, 84  
Aladin, 94  
Alfvén radius, 166  
Alfvén wave, 205, 206  
ambient conditions, 144  
ambient medium, 144  
ambipolar diffusion, 146, 202, 204, 205, 219  
AMR, *see* adaptive mesh refinement  
Astro Runtime, 87  
Astro-Taverna, 87  
AstroGrid, 81  
AstroGrid: authentication, 90  
AstroGrid: client software, 91  
AstroGrid: community service, 90  
AstroGrid: consortium, 85  
AstroGrid: infrastructure, 86  
AstroGrid: Python, 95  
Astroscope, 93

## B

barrier synchronization, 22  
Batchelor coupling, 186  
Bonnor-Ebert sphere, 204–207, 211  
boundary conditions  
  periodic, 151  
bowshock, *see* jet

## C

Cambridge Astronomical Data Centre, 82  
Carina nebula, 144  
Cassiopeia-A, 82  
Common Execution Architecture (CEA), 87  
communication

  collective, 21  
  modes, 15  
  non-blocking, 18  
  overhead, 142  
  point-to-point, 12  
communicator, 27  
  groups, 27  
conservative scheme, *see* scheme  
coronal helmet streamer, 187  
corotation radius, 165  
cross-stream, 187  
current sheet, 181

## D

DALtoolkit, 111  
data challenges, 82  
Data Set Access (DSA), 87, 88  
datatype  
  derived, 32  
  MPI, 12  
disk, *see* accretion  
disk wind, *see* wind  
domain decomposition, 142, 143  
dynamical age, 139

## E

energy equation, 121  
entrainment  
  direct, 139  
  steady state, 148  
equation of state, 193  
equipartition, 196  
Euler equations, 140  
  inviscid, 140  
Euro-VO, 85  
Euro-VO: AIDA, 86  
Euro-VO: DCA, 86  
Euro-VO: VOFC, 86  
Euro-VO: VOTC, 86

Euro-VO: VOTECH, 86  
 European Southern Observatory, 82  
 European Space Agency, 82

## F

Faraday effect, 117  
 fast magnetosonic shock, 189  
 flux-limited diffusion, 118  
 fossil cavity, 151

## G

Gamma Ray Bursts, 198  
 gLite, 48, 49  
   Users Guide, 48, 56  
   Versions, 61, 62  
 gLite Data Management

### Commands

lcg-aa, 70, 72  
 lcg-cp, 70  
 lcg-cr, 70, 72  
 lcg-del, 70, 74  
 lcg-gt, 70, 74  
 lcg-la, 70  
 lcg-lg, 70, 73  
 lcg-lr, 70, 72  
 lcg-ra, 70  
 lcg-rep, 70, 73  
 lcg-rf, 70  
 lcg-uf, 70  
 lfc-chmod, 71  
 lfc-chown, 71  
 lfc-getacl, 71  
 lfc-ln, 71  
 lfc-ls, 71  
 lfc-mkdir, 71  
 lfc-rename, 71, 73  
 lfc-rm, 71  
 lfc-setacl, 71

### Namespaces, 69

Globally Unique Identifier (GUID), 69  
 Logical File Name (LFN), 69  
 Physical File Name (PFN), 69  
 Storage URL (SURL), 69  
 Transport URL (TURL), 69

### gLite Job Management

#### Commands

glite-wms-job-delegate-proxy, 62  
 edg-job-cancel, 62, 67  
 edg-job-get-logging-info, 62  
 edg-job-get-output, 62, 67  
 edg-job-list-match, 62, 65  
 edg-job-status, 62, 67  
 edg-job-submit, 62, 66  
 glite-wms-job-cancel, 62

glite-wms-job-list-match, 62  
 glite-wms-job-logging-info, 62  
 glite-wms-job-output, 62  
 glite-wms-job-status, 62  
 glite-wms-job-submit, 62

### Globus, 49

  Toolkit, 50

gravitational collapse, 150

### Grid e-Learning

  Adaptive, 61  
   Gilda, 55, 61

### Grid Infrastructures

  EGEE, 47, 51  
   LCG, 51

### Grid Job Description, 64

### Grid MPI, 48, 61, 76

  cross-site, 61  
   gLite Support, 76

### Grid Security

  Attribute Certificate (AC), 58  
   Authentication (AuthN), 58  
   Authorization (AuthZ), 58  
   Certificate Authority (CA), 50, 53, 58, 62  
   Certificate Revocation Lists (CRL), 58  
   Federated Identity, 63  
   Federated Identity Management, 51, 78  
   Identity Providers, 50  
   MyProxy, 57, 58, 61, 63  
   Proxy Certificate, 58, 63  
   X.509, 51, 62, 78

### Grid Standardisation and Interoperability

  Grid Interoperability Now (GIN), 50  
   Open Grid Forum (OGF), 50

grid-based solvers, 120

## H

Herbig-Haro object, 201

HH34, 146

HII region, 144

  hypercompact, 130

Hipparcos, 102

hoop stress, 202, 209

### hydrodynamics

  equations, 140  
   models, 139  
   relativistic, 193

## I

implicit numerical methods, 142

initial conditions, 147

initial mass function, 139

### instability, 147

  current-driven, 191  
   Kelvin-Helmholtz, 148, 180

- billow, 183
  - Rayleigh-Taylor, 195
  - tearing, 182
  - interstellar extinction, 117
  - interstellar medium, 144
  - inverse pitch, 196
  - inviscid flow, 139
  - ionisation fraction, 145
  - IPHAS, 102
  - IPython, 97
  - iRODS, 91
  - isothermal, 140
  - IVOA, 84
- J**
- jet, *see* outflow
    - beam cross-shocks, 196
    - bowshock, 149
    - cocoon, 193
    - helically magnetized, 196
    - launching, 156–164, 170
    - length, 137
    - models, 192
    - parsec-scale, 138, 145, 146, 148
    - Poynting flux dominated, 198
    - stability, 138
    - T Tauri, 155, 164
    - velocity, 145
- K**
- Kelvin-Helmholtz instability, *see* instability
- L**
- large-scale flows, 138
  - large-scale simulations, 137, 138
  - line profiles, 149
  - linear stability analysis, 138
  - linearisation, 181
  - load-balancing, 142
- M**
- 2MASS, 103
  - Mach diamonds, 147, 148
  - Mach number, 180
  - magnetic braking, 205–207, 217
  - magnetic field, 145, 147
  - magnetic pressure, 202, 204, 207–210, 214, 218
  - magnetic tension, 202
  - magnetic tower, 202, 208, 210, 218
  - magneto-centrifugal, 202, 210, 212, 214, 218
  - magnetohydrodynamics, 180
    - analytical solutions, 157, 166
    - equations, 140
    - numerical simulations, 159–164, 167–174
    - relativistic, 196
  - magnetosphere, 165–174
  - magnetospheric ejections, 156, 171
  - mass absorption, 121
  - mass-to-flux ratio, 204
  - message, 12
    - receiving, 14
    - sending, 13
  - MHD, *see* magnetohydrodynamics
  - mode degeneracy, 185
  - mode-mode interactions, 183
  - molecular cloud, 139, 144
  - molecular outflow, 139, 148
    - age, 149
    - jet-driven, 139
  - moment methods, 120
  - Monte-Carlo methods, 119, 126
  - MPI\_ALLBARRIER, 25
  - MPI\_BARRIER, 22
  - MPI\_BCAST, 22
  - MPI\_CART\_COORDS, 30
  - MPI\_CART\_CREATE, 29
  - MPI\_CART\_RANK, 30
  - MPI\_CART\_SHIFT, 31
  - MPI\_CART\_SUB, 31
  - MPI\_COMM\_RANK, 11
  - MPI\_COMM\_SIZE, 11
  - MPI\_COMM\_WORLD, 9
  - MPI\_DIMS\_CREATE, 30
  - MPI\_FINALIZE, 10
  - MPI\_GATHER, 23
  - MPI\_INIT, 9
  - MPI\_IRecv, 19
  - MPI\_ISEND, 19
  - MPI\_RECV, 14
  - MPI\_REDUCE, 24
  - MPI\_SCAN, 25
  - MPI\_SCATTER, 23
  - MPI\_SEND, 13
  - MPI\_TEST, 19
  - MPI\_TYPE\_COMMIT, 34
  - MPI\_TYPE\_CONTIGUOUS, 33
  - MPI\_TYPE\_STRUCT, 34
  - MPI\_TYPE\_VECTOR, 33
  - MPI\_WAIT, 19
- N**
- NASA SR71, 147
  - NED, 98
  - nested grid, 202, 203
  - non-conservative scheme, *see* scheme
  - normal modes, 181

numpy, 98

NVO, 84

## O

Ohmic dissipation, 202, 204

outflow, *see* jet

bipolar, 202, 208

episodic, 137, 145

## P

parallelisation, 142, 143

parsec-scale, 137

penetration depth, 124

Planck function, 121

plasma beta, 180

PLASTIC, 94

polarization, 117

polytropic index, 193

position-velocity diagrams, 149

pseudospectral, 189

PyFITS, 98

Python, 96

## Q

quasilinear, 189

## R

radiation field

stationary, 120

radiative cooling, 140, 145, 148

radiative transfer, 117, 142

continuum, 119, 120

inverse three dimensional, 132

line, 119

ray-tracing, 118, 124

adaptive, 120

solvers, 120

reddening, 117

reduction operation, 24

Registry, 87, 90

Registry of Registries, 87

remnant disk, 131

Riemann problem, 141

## S

Sagittarius dwarf galaxy, 109

SAMP, 95

sausage mode, 182

scattering coefficients, 121

scattering cross section, 121

scattering integral, 118

scheme

conservative, 141

non-conservative, 141

shock-capturing, 141

science roadmaps, 83

SDSS, 103

self-gravity, 142

shock-shock interactions, 186

SIAP, 84

sinuous mode, 185

smoothed particle hydrodynamics, 202, 203

sound speed, 145

spanwise, 187

spectral energy distribution, 126

SPH, *see* smoothed particle hydrodynamics

SQL, 88

star formation

early phase, 127

self-regulated, 139

stellar wind, *see* wind

streamwise, 187

structure approximations, 118

subharmonics, 183

switch-on shock, 180

synthetic observation, 198

## T

Taverna, 87

truncation radius, 166, 167

turbulence, 139, 150

compressible MHD, 150

large scale, 151

magneto-, 182

TVD Lax Friedrichs, 196

## U

UKIDSS, 105

Unified Content Descriptors, 84

## V

varicose mode, 185

Virtual Observatory, 81

Virtual Organisation

Commands

voms-proxy-info, 63, 64

voms-proxy-init, 63

VOMS, 58

virtual topology, 29

VODesktop, 87, 91

VODesktop: AstroScope, 93

VODesktop: Query Builder, 93

VODesktop: Task Runner, 93

VOExplorer, 92

vortex coalescence, 183

vortex disruption, 182

VOSpace, 85, 87

**W**

W3C, 85

wake flow, 187

wave number doubling, 190

wind

    disk, 156–164

    stellar, 156, 165, 170

work-flows, 95

**Z**

zero resistivity, 140