

Contents

Part I Introductory Reviews

Astrophysical Jets	3
Mario Livio	
Jets from Young Stars	11
John Bally	

Part II The Star/Jet/Disk System

The Star-Jet-Disk System and Angular Momentum Transfer	23
Lee Hartmann	
Hot Inner Winds from T Tauri Stars	33
Christopher M. Johns-Krull	
Hot Gas in Accretion Disks and Jets: An UV View of Star Formation	43
Ana I. Gómez de Castro	
Generalized Multipole X-Wind Model	51
Subhanjoy Mohanty and Frank H. Shu	
Instabilities in Accretion Disks	57
James M. Stone	
Theory of Wind-Driving Protostellar Disks	67
Arieh Königl	
Aspect Ratio Dependence in Magnetorotational Instability Shearing Box Simulations	77
Andrea Mignone, Attilio Ferrari, Gianluigi Bodo, Paola Rossi, and Fausto Cattaneo	

Advection/Diffusion of Large Scale Magnetic Field in Accretion Disks	83
Richard V.E. Lovelace, David M. Rothstein, and Gennady S. Bisnovatyi-Kogan	
Magnetic Reconnection in Accretion Disk Systems: From BHs to YSOs	89
Elisabete M. de Gouveia Dal Pino, Pamela Piovezan, Grzegorz Kowal, and Alex Lazarian	
 Part III Jet Launching	
Self-Collimated Jets from Accretion Discs and Star-disc Interaction Zones	99
Jonathan Ferreira	
Large-Scale 3D Simulations of Protostellar Jets	111
Jan Staff, Kai Cai, Brian Niebergal, Rachid Ouyed, and Ralph Pudritz	
Magnetic Field Advection in Weakly Magnetised Viscous Resistive Accretion Disks: Numerical Simulations	117
Gareth C. Murphy, Claudio Zanni, and Jonathan Ferreira	
Extending Analytical MHD Jet Formation Models with a Finite Disk Radius	123
Matthias Stute, Kanaris Tsinganos, Nektarios Vlahakis, Titos Matsakos, and José Gracia	
Magnetohydrodynamic Jets from Different Magnetic Field Configurations	131
Christian Fendt	
Resistive MHD Jet Simulations with Large Resistivity	137
Miljenko Čemeljić, José Gracia, Nektarios Vlahakis, and Kanaris Tsinganos	
The X-wind Model	143
Mike J. Cai	
Disk-Magnetosphere Interaction and Outflows: Conical Winds and Axial Jets	153
Marina M. Romanova, Galina V. Ustyugova, Alexander V. Koldoba, and Richard V.E. Lovelace	
Simulating the Launching of YSO Jets	165
Claudio Zanni	

On the Effect of Stellar Wind Braking onto the Central Object	173
Christophe Sauty, Noemie Globus, Zakaria Meliani, Kanaris Tsinganos, Nektarios Vlahakis, and Edo Trussoni	
Flaring Activity in Accretion Flows of Young Stellar Objects	179
Fabio Reale	
Similarities of the Launching Mechanism in Protostellar/AGN Jets	185
Ryoji Matsumoto	
Formation of Episodic Magnetically Driven Radiatively Cooled Plasma Jets in Laboratory Experiments	195
Francisco Suzuki-Vidal, Sergey V. Lebedev, Andrea Ciardi, Simon N. Bland, Jeremy P. Chittenden, Gareth N. Hall, Adam Harvey-Thompson, Alberto Marocchino, Cheng Ning, Chantal Stehle, Adam Frank, Eric G. Blackman, Simon C. Bott, and Tom Ray	
Jets in the MHD Context	205
Nektarios Vlahakis	
 Part IV Observational Constraints on Jet Launching	
Jets from Embedded Protostars	215
Brunella Nisini	
Accretion Luminosity of Embedded Protostars	225
Simone Antoniucci	
Resolved Inner Jets from T Tauri Stars	231
Francesca Bacciotti	
Searching for Jet Rotation Signatures in Class 0 and I Jets	241
Deirdre Coffey, Francesca Bacciotti, Antonio Chrysostomou, Brunetta Nisini, and Chris Davis	
Observational Constraints to Steady Jet Models in Young Stars	247
Sylvie Cabrit	
Searching for Brown Dwarf Outflows	259
Emma M. Whelan, Tom Ray, Francesca Bacciotti, Sofia Randich, and Antonella Natta	
Protostellar Jets Driven by Intermediate- and High-Mass Protostars: An Evolutionary Scenario?	267
Alessio Caratti o Garatti, Jochen Eislöffel, Dirk Froebrich, Brunella Nisini, and Teresa Giannini	

General Properties of Jets from Active Galactic Nuclei and Comparison with Protostellar Jets	273
Silvano Massaglia	
 Part V Jet Propagation, Stability, Interaction with the Environment, X-ray Emission	
The Kelvin-Helmholtz Instability in Stellar Jets	285
Edo Trussoni	
Radiative Jets from Variable Sources	295
Alejandro C. Raga, Jorge Cantó, Fabio De Colle, Alejandro Esquivel, Primož Kajdic, Ary Rodríguez- González, and Pablo F. Velázquez	
Position-Velocity Analysis of HH 111: Physical Structure and Dust Content	305
Linda Podio, Silvia Medves, Francesca Bacciotti, Jochen Eislöffel, and Tom Ray	
Application of Tomographic Techniques to Stellar Jets	311
Fabio De Colle, Carlos del Burgo, and Alejandro C. Raga	
Measurement of Magnetic Fields in Stellar Jets	317
Patrick Hartigan	
Jet Kinematics	329
Alessio Caratti o Garatti and Jochen Eislöffel	
Synthetic Jets – from Models to Observations and Back	341
José Gracia	
X-Ray Emission from Young Stellar Jets	347
Manuel Güdel, Stephen L. Skinner, Sylvie Cabrit, Jochen Eislöffel, Catherine Dougados, Roland Gredel, and Kevin R. Briggs	
The Complex Morphology of the X-Ray and Optical Emission from HH 154: The Pulsed Jet Scenario	353
Rosaria Bonito, Salvatore Orlando, Giovanni Peres, Fabio Favata, and Jochen Eislöffel	
Radiative Shocks in the Context of Young Stellar Objects: A Combined Analysis from Experiments and Simulations	359
Chantal Stehlé, Matthias González, Edouard Audit, and Thierry Lanz	

X-Ray Imaging Spectroscopy of Planetary Nebulae in the Chandra/XMM Era: New Insight into Stellar Jets	367
Joel H. Kastner	

3D Modeling of the 2006 Nova Outburst of RS Ophiuchi: Collimated Outflows and Jet-Like Ejections	373
Salvatore Orlando, Jeremy J. Drake, and J. Martin Laming	

Part VI Molecular Outflows and Turbulence Injection by Jets

Molecular Outflows: Observations	381
Rafael Bachiller	

Driving Mechanisms for Molecular Outflows	395
Turlough P. Downes	

Protostellar Jet and Outflow in the Collapsing Cloud Core	405
Masahiro N. Machida, Shu-ichiro Inutsuka, and Tomoaki Matsumoto	

Outflow Driven Turbulence in Star Forming Clouds	411
Adam Frank	

Jet Driven Turbulence?	421
Robi Banerjee, Susanne Horn, and Ralf S. Klessen	

Prospects for Outflow and Jet Science with ALMA	429
John Richer	

Part VII JETSET Early Stage Researcher Presentations

Two-component Jet Simulations: Combining Analytical and Numerical Approaches	441
Titos Matsakos, Silvano Massaglia, Edo Trussoni, Kanaris Tsinganos, Nektarios Vlahakis, Christophe Sauty, and Andrea Mignone	

Jets from Young Stellar Objects: From MHD Simulations to Synthetic Observations	447
Ovidiu Teșileanu, Andrea Mignone, and Silvano Massaglia	

Molecular Cooling in Large Scale Simulations of Protostellar Jets	453
Jamie O’Sullivan and Max Camenzind	

Survival of Molecules in MHD Disk Winds	459
Despina Panoglou, Sylvie Cabrit, Paolo J.V. Garcia, and Guillaume Pineau des Forêts	

Sheared Magnetic Field and Kelvin Helmholtz Instability	465
Matteo Bocchi, Hubert Baty, and Max Camenzind	
Jets from Class 0 Protostars: A Mid-IR Spitzer View	471
Odysseas Dionatos	
0.15'' Study of the Atomic and Molecular Jets in DG Tau	477
Vanessa Agra-Amboage, Catherine Dougados, and Sylvie Cabrit	
Velocity Resolved IR Diagnostics of Class I Jets	485
Rebecca García López, Brunella Nisini, Teresa Giannini, Jochen Eislöffel, Francesca Bacciotti, and Linda Podio	
Laboratory Astrophysics: Episodic Jet Ejections	491
Alberto Marocchino, Jeremy P. Chittenden, Andrea Ciardi, Francisco A. Suzuki-Vidal, and Chantal Stehle	
Parameter Study in Disk Jet Systems	497
Petros Tzeferacos, Attilio Ferrari, Andrea Mignone, Silvano Massaglia, Gianluigi Bodo, and Claudio Zanni	
Early Stage Development of the Jetset Database	503
Periklis Rammos, Emma T. Whelan, José Gracia, Stephane Dudzinski, and Philippe Grange	
 Part VIII Posters	
Shaping Planetary Nebulae by Jets	507
Muhammad Akashi	
New Herbig-Haro Objects in the Gulf of Mexico	511
Tina Armond, Bo Reipurth, and Luiz Paulo R. Vaz	
Launching Jets from MRI-driven Accretion Discs	515
Steffen Brinkmann and Max Camenzind	
Properties of Jet Emitting Discs	519
Céline Combet and Jonathan Ferreira	
The H₂ Velocity Field of Inner Knots in HH 212	523
Serge Correia, Hans Zinnecker, Stephen Ridgway, and Mark McCaughrean	
Magnetic Fields in Low-Mass Star Forming Regions: Alignment to Jets/Outflows?	527
Rachel L. Curran and Antonio Chrysostomou	
Interacting Knots in Jets: Simulations vs. Observations	531
Fabio De Colle and Alessio Caratti o Garatti	

Wide Field JCMT HARP-B CO(3-2) Mapping of the Serpens Cloud Core	535
Odysseas Dionatos, Brunella Nisini, Teresa Giannini, Claudio Codella, John Richer, and Mario Tafalla	
Numerical Simulations of Herbig Haro Objects: A Low Excitation HH Object	539
Alejandro Esquivel, Alejandro C. Raga, and Fabio De Colle	
Soft X-rays from DG Tau: A Physical Jet Model	543
Hans Moritz Günther, Sean P. Matt, and Zhi-Yun Li	
Multifluid Simulations of the Kelvin-Helmholtz Instability in a Weakly Ionised Plasma	547
Aoife C. Jones, Mohsen Shadmehri, and Turlough P. Downes	
Large-scale 3D Simulations of Protostellar Jets: Long-term Stability and Jet Rotation	551
Kai Cai, Jan Staff, Brian P. Niebergal, Ralph E. Pudritz, and Rachid Ouyed	
Extragalactic Jets with Helical Magnetic Fields	555
Rony Keppens and Zakaria Meliani	
Jets from Collapsing Stars	559
Volodymyr Kryvdyk	
Outflows in High-Mass Star Forming Regions	563
Ana López-Sepulcre, Claudio Codella, Riccardo Cesaroni, Maite T. Beltrán, Nuria Marcellino, and Luca Moscadelli	
Astrophysical Jet Experiment	567
Berenice Loupías, Claire Michaut, Chris D. Gregory, Emeric Falize, Jonathan Waugh, Dono Seiichi, S. Pikuz, Yasuhiro Kuramitsu, Alessandra Ravasio, Serge Bouquet, Wigen Nazarov, Youichi Sakawa, Nigel Woolsey, and Michel Koenig	
The Angular Momentum of Dense Clumps in Elephant Trunks	571
Veronica Lora, Alejandro C. Raga, and Alejandro Esquivel	
A Precessing Jet in the NGC 2264 G Outflow	573
Carolyn McCoey, Paula S. Teixeira, Michel Fich, and Charles J. Lada	
Line Diagnostics of Large Scale Jets from Classical T Tauri Stars: The Case of DG Tau	577
Fiona McGroarty, Linda Podio, Francesca Bacciotti, and Tom Ray	

Relativistic Two-Component Hydrodynamic Jets	581
Zakaria Meliani and Rony Keppens	
The Physical Properties of the RW Aur Bipolar Jet from HST/STIS High-Resolution Spectra	585
Stanislav Melnikov, Jochen Eisloffel, Francesca Bacciotti, Jens Woitas, and Tom Ray	
Stability of Magnetized Spine-Sheath Relativistic Jets	589
Yosuke Mizuno, Philip E. Hardee, and Ken-Ichi Nishikawa	
Chemical Models of Hot Molecules at Shocks in Outflows	593
Hideko Nomura and Tom J. Millar	
Survival of H_2 and CO in MHD Disk Winds of Class 0, Class I and Class II Stars	595
Despina Panoglou, Paolo J.V. Garcia, Sylvie Cabrit, and Guillaume Pineau des Forêts	
Three-Fluid Magnetohydrodynamics in Star Formation	597
Cecilia Pinto and Daniele Galli	
Physical Conditions of the Shocked Regions of Planetary Nebulae	601
Angels Riera, Alejandro C. Raga, Garrelt Mellema, Alejandro Esquivel, and Pablo F. Velázquez	
The Jets of the Proto-Planetary Nebula CRL 618	603
Angels Riera, Alejandro C. Raga, Pablo F. Velázquez, Sinhue Haro-Corzo, and Primoz Kajdic	
The Formation of Filamentary Structures in Radiative Cluster Winds	605
Ary Rodríguez-González, Alejandro Esquivel, Alejandro C. Raga, and Jorge Cantó	
Hydrodynamic Modeling of Accretion Shock on CTTs	607
Germano G. Sacco, Constanza Argiroffi, Salvatore Orlando, Antonio Maggio, Giovanni Peres, and Fabio Reale	
MRI and Outflows: Angular Momentum Transport in Protoplanetary Disks	611
Raquel Salmeron	
Analysis of the Central X-ray Source in DG Tau	615
P. Christian Schneider and Jürgen H.M.M. Schmitt	
Verification of Candidate Protostellar Outflows in GLIMPSE	619
Bringfried Stecklum, Alessio Caratti o Garatti, Chris Davis, Hendrik Linz, Thomas Stanke, and Hans Zinnecker	

Young Stellar Jets and Outflows in the Massive Star Forming Complex W5	623
Guy S. Stringfellow, John Bally, and Adam Ginsburg	
Water Masers and Radio Continuum Emission Tracing Thermal Radio Jets	627
M.A. Trinidad	
Effects of Flaring Activity on Dynamics of Accretion Disks in YSOs	631
Tatiana G. Yelenina, Salvatore Orlando, Fabio Reale, Giovanni Peres, Andrea Mignone, and Titos Matsakos	
Index	635
A Color Figures	641

The contributions include a picture of the first author where available. Most of the photographs have been taken by Sotiria Fotopoulou and Athina Pouri during the conference, the conference dinner, coffee breaks or the excursion. Some pictures have been kindly provided by the author himself/herself.

<http://www.springer.com/978-3-642-00575-6>

Protostellar Jets in Context

Tsinganos, K.; Ray, T.; Stute, M. (Eds.)

2009, XXXII, 662 p. 280 illus., 43 illus. in color.,

Hardcover

ISBN: 978-3-642-00575-6