

Curriculum Vitæ of Roberto Lionello

Education

1997 PhD in Astronomy, University of Florence (Italy)

1992 Degree in Astronomy (110/110 cum laude), University of Bologna, Italy.

Experience

Dr. Lionello has experience in computer simulations applied to several fields of astrophysics and solar physics. He has worked on the implementation of numerical algorithms on vector and parallel supercomputers. During his Ph. D. under Prof. Giorgio Einaudi at the Department of Astronomy at the University of Florence Italy, he studied the nonlinear kink instability in solar coronal configurations in collaboration with Drs. Mikić and Schnack of Science Applications International Corporation in San Diego. In June 1997 he joined SAIC. He also obtained a NATO Advanced Fellow at the University of California, Irvine. He is mainly interested in the simulations of the large scale structure of the solar corona and of the solar wind and on the development of new algorithms on tetrahedral grids. He is a member of the American Geophysical Union and the American Astronomical Society. He is co-winner of the SAIC 1999 Publication Prize for Physics and of the 2006 Group Performance Award. In 2008 he joined Predictive Science, Inc.

Publications

- Einaudi G., Lionello R., Velli R., *Magnetohydrodynamic Simulations in Cylindrical Coordinates*, Science and Supercomputing at CINECA - 1995 Report.
- Lionello R., *Implementation of a Computational MHD Code on the Cray T3D at CINECA*, Arcetri Technical Report N. 5/1996, 1996
- Einaudi G., Lionello R., Velli M., *Magnetic Reconnection in Solar Coronal Loops*, Adv. Space Res., **19**, 1875, 1997
- Velli M., Lionello R., Einaudi G., *Kink Modes and Current Sheets in Coronal Loops*, Solar Physics, **172**, 157, 1997
- Lionello R., *Three Dimensional Imaging for Magnetohydrodynamic Computations*, WSCG'97 Proceedings, 1997, p. 282.
- Lionello R., Mikić Z., Schnack D. D., *Magnetohydrodynamics of Solar Coronal Plasmas in Cylindrical Geometry*, J. Comp. Phys., **140**, 172, 1998
- Lionello R., Einaudi G., Velli M., Mikić Z., *Non Linear MHD Evolution of Line-tied Coronal Loops*, Astrophys. J., **494**, 840, 1998

- Lionello R., Linker J. A., Mikić Z., *An Improved Semi-Implicit MHD Algorithm for Plasmas with Large Flows*, Proceedings of the “16th International Conference on the Numerical Simulation of Plasmas”, UCLA, DEO, NASA-JPL, Santa Barbara CA, 1998, p. 237.
- Lionello R., Schnack D. D., Einaudi G., Velli M., *Current Sheet Formation due to Nonlinear Kink Modes in Periodic and Line-tied Configurations*, Phys. Plasmas, **10**, 3722, 1998
- Baty, H., Einaudi G., Lionello R., Velli M., *Ideal Kink Instabilities in Line-tied Coronal Loops*, Astron. & Astrophys., **333**, 313, 1998
- Mikić Z., Linker J. A., Schnack D. D., Lionello R., Tarditi A., *Magnetohydrodynamic Modeling of the Global Solar Corona*, Phys. Plasmas, **5**, 2217, 1999
- Lionello R., Mikić Z., Linker J. A., *Stability of Algorithms for Waves with Large Flows*, J. Comp. Phys., **152**, 346, 1999
- Lionello R., Linker J. A., Mikić Z. *Magnetohydrodynamics of the Solar Corona and the Transition Region*, Proceedings of 9th European Meeting on Solar Physics, “Magnetic Fields and Solar Processes”, A. Wilson ed., p. 1181, ESA Publications Division, Noordwijk, 1999
- Mikić Z., Linker J. A., Riley P., and Lionello R. *Predicting the Eclipse Corona Using an MHD Model*, in “The Last Total Solar Eclipse of the Millennium”, W. Livingston and A. Özgüç eds., Astronomical Society of the Pacific Conference Series, Vol. 205, p. 162, 2000
- Riley, P., Linker, J., Mikić, Z., and Lionello, R., *MHD Modeling of the Solar Corona and Inner Heliosphere: Comparison with Observations*, in “Space Weather”, P. Song, H. J. Singer, and G. L. Siscoe eds., Geophys. Monograph, 125, AGU, 2001, p. 159
- Lionello R., Linker, J. A., Mikić, Z. *Including the Transition Region in Models of the Large-Scale Solar Corona*, Astrophys. J., **546**, 542, 2001
- Linker J. A., Lionello R., Mikić Z., and Amari T. *Magnetohydrodynamic Modeling of Prominence Formation within a Helmet Streamer*, J. Geophys. Res., **106**, 25165, 2001
- Lionello R., Mikić Z., Linker J. A., and Amari T. *Magnetic Field Topology in Prominences*, Astrophys. J., **581**, 718, 2002
- Odstrcil, D., Linker, J. A., Lionello, R., Mikic, Z.; Riley, P., Pizzo, V. J., and Luhmann, J. G. *3-D MHD simulations of CMEs by coupled coronal and heliospheric models*, in Solar variability: from core to outer frontiers. The 10th European Solar Physics Meeting, 9-14 September 2002, Prague, Czech Republic. Ed. A. Wilson. ESA SP-506, Vol. 1. Noordwijk: ESA Publications Division, ISBN 92-9092-816-6, 2002, p. 95-98

- Odstrcil, D., Linker J. A. , Lionello R., Mikić Z., Riley P., Pizzo V. J. , and Luhmann J. G., *Merging of Coronal and Heliospheric Numerical Two-dimensional MHD models*, J. Geophys. Res., **107**, 1493, 2002.
- Linker, J. A., Mikić, Z., Lionello, R., Riley, P., Amari, T., and Odstrcil, D. *Flux cancellation and coronal mass ejections*, Phys. Plasmas, **10**, 1971, 2003
- Lionello, R., Linker, J. A., Mikić, Z., *Three-dimensional Magnetohydrodynamic of the Solar Corona and the Solar Wind with Improved Energy Transport*, in “Solar Wind Ten, Proceedings of the Tenth International Solar Wind Conference”, American Institute of Physics Conference Proceedings 679. Melville, New York: American Institute of Physics, 2003, p. 222
- Odstrcil, D., PizzoV. J. , Linker, J. A., Riley P., Lionello, R., Mikić Z. *Initial Coupling of Coronal and Heliospheric Numerical Magnetohydrodynamic Codes*, J. Atmos. Solar-Terrestrial Phys., , **66**, 1321, (2004).
- Riley P., Linker, J. A., Lionello, R., Mikić, Z., Odstrcil, D., Hidalgo, M. A., Hu, Q., Lepping, R. P., Lynch, B. J., and Rees, A., *Fitting Flux Ropes to a Global MHD Solution: A Comparison of Techniques*, J. Atmos. Solar-Terrestrial Phys., **66**, 1311, (2004).
- Mok, Y., Mikić, Z., Lionello, R., and Linker, J. A. *Calculating the Thermal Structure of Solar Active Regions in Three Dimensions*, Astrophys. J., **621**, 1098, (2005).
- Linker, J. A., Lionello, R., Mikic, Z., and Riley, P. *Time-Dependent Response of the Large-Scale Solar Corona*. In “ESA SP-596: Chromospheric and Coronal Magnetic Fields”. (2005)
- Lionello, R., Riley, P., Linker, J. A., and Mikić, Z. *The Effects of Differential Rotation on the Magnetic Structure of the Solar Corona: Magnetohydrodynamic Simulations*, Astrophys. J., **625**, 463, (2005).
- Lionello, R., Linker, J. A., Riley, P., and Mikić, Z. *Latitudinal Excursion of Coronal Magnetic Field Lines in Response to Differential Rotation: MHD Simulations* Astrophys. J. Letters, **642**, 69, (2006).
- Riley, P., Linker, J. A., Mikić, Z., Lionello, R., Ledvina, S. A., and Luhmann, J. G. *A Comparison between Global Solar Magnetohydrodynamic and Potential Field Source Surface Model Results* Astrophys. J., **653**, 1510, (2006).
- Mikić, Z., Linker, J. A., Lionello, R., Riley, P., and Titov, V., *Predicting the Structure of the Solar Corona for the Total Solar Eclipse of March 29, 2006*, in “Solar and Stellar Physics Through Eclipses” (O. Demircan, S. O. Selam, and B. Albayrak, eds.), Astronomical Society of the Pacific Conference Series, Vol. 370, p. 299 (2007).

- Riley, P., Lionello, R., Mikić, Z., Linker, J. A., and Clark, E., "Bursty" Reconnection Following Solar Eruptions: MHD Simulations and Comparison with Observations *Astrophys. J.*, **655**, 591, (2007).
- Wolfson, R., Larson, J., and Lionello, R. Maximum Energies of Force-Free Coronal Flux Rope *Astrophys. J.*, **660**, 1683, (2007).
- Riley, P., Lionello, R., Mikić, Z., and Linker, J. A., Using Global Simulations to Relate the Three-Part Structure of Coronal Mass Ejections to In Situ Signatures *Astrophys. J.*, **672**, 1221, (2008).
- Titov, V. S., Mikić, Z., Linker, J. A., and Lionello, R., 1997 May 12 Coronal Mass Ejection Event. I. A Simplified Model of the Preeruptive Magnetic Structure *Astrophys. J.*, **675**, 1614, (2008).
- Mok, Y., Mikić, Z., Lionello, R., and Linker, J. A., The Formation of Coronal Loops by Thermal Instability in Three Dimensions *Astrophys. J.*, **679**, 161, (2008).
- Lionello, R., Linker, J. A., and Mikić, Z. Multispectral Emission of the Sun during the First Whole Sun Month: MHD Simulations *Astrophys. J.*, **690**, 902, (2009).