CURRICULUM VITÆ

Manolis K. Georgoulis

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March, 2000

1 Personal Data

DATE OF BIRTH:	August 14, 1969
PLACE OF BIRTH:	Sykiada, Chios, Greece
NATIONALITY:	Greek
MARITAL STATUS:	Engaged with Mrs. D. Stefaniorou
MILITARY SERVICE:	From March, 1998 to February, 2000 Lieutenant of Artillery of the Hellenic Army

2 Degrees

- B. Sc. in Physics: Department of Physics, University of Thessaloniki, Greece (March 1993)

3 Membership in Societies

- Junior Member of the Hellenic Astronomical Society (1995)

4 Scholarships

- Greek State Foundation of Scholarships for Ph.D. Students (1996)

- European Astrophysical Doctoral Network through the ERASMUS Program (September 1996 - September 1997)

5 Teaching Experience

- Tutor for the course "Plasma Physics" during the first term of the Academic Years 1994-95, 1995-96, Department of Physics, University of Thessaloniki

6 Topics of Research

- Self - Organized Criticality (SOC) embedded in 2D and 3D Cellular Automata (CA) Models
- Modelling Flaring and Subflaring Activity in Solar Active Regions through Cellular Automata Models - Complexity and Fragmentation of Energy Release in Solar Active Regions
- The Statistical Proximity between SOC/CA models and Magnetohydrodynamic (MHD) Turbulence in the Solar Corona - Scale Invariance and Scaling Laws
- Implications of Statistical Solar Flare Models with Coronal Heating - Statistical Heating due to Subflaring Activity in Solar Coronal Loops
- Straightforward Statistical Comparison between Solar Hard X-Ray Bursts, Type I Bursts and EUV Bright Points
- The Degree of Discretization of the MHD Equations to meet the simplified Rules of CA Models in the Solar Corona

7 Computing Experience

- Remote Systems: MS-DOS, MS-Windows 3.x, 98, UNIX, LINUX
- Facilities used: PC Computers, HP-UX 9000 Series 700 / UNIX Workstations, SUN-SPARC Workstations, IBM Workstations, CRAY Supercomputer
- Programming Languages: FORTRAN 77, FORTRAN 90, CRAY FORTRAN, IDL, MATHEMATICA
- Graphics and Image Processing: GRAPHER (DOS & WINDOWS), SURFER, ORIGIN, PGPLOT, XGOBI, MATHEMATICA, IDL, CORELDRAW, PHOTOSHOP
- Animation: LE PREMIERE, FPS60, IDL

8 Collaborations

- With Dr. Robert Walsh on *Modelling Microflares and Nanoflares in Solar Coronal Loops*, St. Andrews, Scotland, 1996
- With Profs. Giorgio Einaudi & Marco Velli on *MHD Simulations of Flaring Activity and the Statistical Flare Model*, Pisa, Italy, 1996-97
- With Prof. Nicole Vilmer on *X-Ray Observations of Flaring Activity and Self-Organized Criticality*, Meudon, Paris, France, 1997
- With Drs. Gerard Trottet and Claude Mercier on *Statistical Properties of Solar Type I Radio Bursts*, Meudon, Paris, France, 1997
- With Prof. Jean-Claude Vial and Dr. Karine Bocchialini on *Statistical Properties of EUV Bright Points Observed by SOHO*, Orsay, Paris, France 1997
- With Dr. Dimitrios Vassiliadis on "Derivation of Solar Flare CA Models from a Subset of MHD Equations", NASA/GSFC/USRA, Greenbelt, USA

9 Visits in Universities & Institutes

- **Visiting Researcher**, School of Mathematical and Computational Sciences, University of St. Andrews, St. Andrews, Scotland, UK, September 1996
- **Visiting Researcher**, Dipartimento di Fisica, Universita di Pisa, Pisa, Italy, October 1996 - February 1997
- **Visiting Researcher**, DASOP, Observatoire de Paris, Section d' Astrophysique de Meudon, Paris, France, March 1997 - April 1997
- **Visiting Researcher**, Institute d' Astrophysique Spatiale, Universite Paris XI, Orsay, Paris, France, May 1997 - July 1997

10 Lectures & Presentations during Visits

- *The Statistical Flare Model and its Significance to Heating of Solar Coronal Loops*, School of Mathematical and Computational Sciences, University of St. Andrews, Scotland, UK, September 1996
- *Self-Organized Criticality - Application in Complex Astrophysical Systems*, Arcetri Observatory, Università di Firenze, Florence, Italy, December 1996
- *The Statistical Flare Model - Methodology and Results*, DASOP, Observatoire de Paris - Meudon, Paris, France, April 1997

- *Self-Organized Criticality - A Proximity with Turbulence and Fractal Behaviour*, LPCE, Univertity of Orlèans, France, April 1997
- *Self-Organized Criticality and The Statistical Flare Model of Flaring Activity*, Institute d' Astrophysique Spatiale, University of Paris XI, Orsay, Paris, France, June 1997

11 Participation in Research Projects

- *Generation of Electromagnetic and Gravitational Waves & Wave - Particle Interactions in Astrophysics*, Hellenic Ministry of Research and Technology (P.I. Prof. N. Spyrou), 1992 - 93
- *The Dynamics of Complex Astrophysical Systems: Acceleration and Plasma Radiation Processes*, Hellenic Ministry of Research and Technology (P.I. Prof. L. Vlahos), 1996 - 97

12 Participation in Conferences & Advanced Schools

1. 7^{th} *EADN Summer School*, San Miniato, Italy, 1994. **Oral Presentation**
2. *NATO ASI on Solar and Astrophysical Magnetohydrodynamical Flows*, Herakleion, Crete, Greece, 1995. **Poster Presentation**
3. *Second Astronomical Conference of the Hellenic Astronomical Society*, Thessaloniki, Greece, 1995. **Oral Presentation**
4. 8^{th} *European Meeting on Solar Physics*, Thessaloniki, Greece 1996. **Oral Presentation**
5. *MHD Summer School on MHD Reconnection in Solar and Magnetospheric Plasmas*, St. Andrews, Scotland, 1996. **Oral Presentation**
6. *Nonlinear Dynamics of Magnetized Fluids and Plasmas*, Pisa, Italy, 1997. **Oral Presentation**
7. 3^{rd} *Hellenic Astronomical Conference (JENAM - 97)*, Thessaloniki, Greece, 1997. **Oral & Poster Presentation**
8. *Summer School on Theoretical and Observational Issues in the Context of the SOHO Mission*, Orsay, France, 1997 **Oral Presentation**

13 Conference & School Organizations

- I have been a member of the Local Organising Committee of the 8^{th} *European Meeting on Solar Physics*, Thessaloniki, Greece, 13-18 May 1996

14 Publications

14.1 Thesis

1. Georgoulis, M. K.: *Galaxy Formation and Study of the Large - Scale Structure of the Universe*, Diploma Thesis, Thessaloniki, Greece, 1993 (in Greek)

2. Georgoulis, M. K.: *Spatiotemporal Evolution of Complex Active Regions - Mechanisms of Energy Release in the Solar Corona*, Ph.D. Thesis, to be completed before October 2000, (in Greek)

14.2 Refereed Journals[1]

1. Vlahos, L., **Georgoulis, M.**, Kluiving, R. & Paschos, P.: The Statistical Flare, *Astron. Astroph.* **299**, 897, 1995

2. **Georgoulis, M.**, Kluiving, R. & Vlahos, L.: Extended Instability Criteria in Isotropic and Anisotropic Energy Avalanches, *Physica A*, **218**, 191, 1995

3. **Georgoulis, M. K.** & Vlahos, L.: Coronal Heating by Nanoflares and the Variability of the Occurrence Frequency in Solar Flares, *ApJ Letters*, **469**, L135, 1996

4. Anastasiadis, A., Vlahos, L., & **Georgoulis, M.K.**: Electron Acceleration by Random DC Electric Fields, *ApJ*, **489**, 367, 1996

5. **Georgoulis, M. K.** & Vlahos, L.: Variability of the Occurrence Frequency of Solar Flares and the Statistical Flare, *Astron. Astroph.*, **336**, 721, 1998

6. **Georgoulis, M. K.**, Velli, M. & Einaudi, G.: Statistical Properties of Magnetic Activity in the Solar Corona, *ApJ*, **497**, 957,1998

7. Vassiliadis, D., Anastasiadis, A, Vlahos, L. & **Georgoulis, M.**: Derivation of Solar Flare Cellular Automata Models from a Subset of the Magnetohydrodynamical Equations, *ApJ Letters*, **509**, L53, 1998

8. Aletti, V., Velli, M., Bocchialini, K., **Georgoulis, M.** & Vial, J. C.: Microscale Structures on the Quiet Sun and Coronal Heating, *ApJ*, 2000, submitted

[1] PDF as well as uu-encoded PostScript copies of the articles can be found in http://www.astro.auth.gr/~georgoul/papers.html

14.3 Conference Proceedings & Special Volumes

1. **Georgoulis, M. K.**, Vlahos, L. & Kluiving, R.: Are Flares a Result of a Self-Organization Process in Active Regions ? , Proc. of the 2^{nd} Hellenic Astronomical Conference (eds: M. E. Contadakis, J. D. Hadjidemetriou, L. N. Mavridis, & J. H. Seiradakis), Hellenic Astronomical Society, p52, 1996

2. Mylonas, N., Kluiving, R., Vlahos, L. & **Georgoulis, M.**: Competition Model for the Evolution of Complex Active Regions, Proc. of the 2^{nd} Hellenic Astronomical Conference (eds: M. E. Contadakis, J. D. Hadjidemetriou, L. N. Mavridis, & J. H. Seiradakis), Hellenic Astronomical Society, 1996.

3. Mylonas, N., Kluiving, R., Vlahos, L. & **Georgoulis M.**: A Cellular Automaton Model for the Formation and Evolution of Active Regions, JOSO Annual Report, 1996

4. **Georgoulis, M.**, Velli, M. & Einaudi, G.: MHD Turbulence and Statistics of Energy Release in the Solar Corona, Proc. of the Fifth SOHO Workshop (ed: A. Wilson), European Space Agency, p401, 1997

5. **Georgoulis, M. K.**, Einaudi, G. & Velli, M.: Statistical Properties of Magnetic Activity in the Solar Corona, Proc. of the 6^{th} European and 3^{rd} Hellenic Astronomical Conference, Abstract, p38, 1997

6. **Georgoulis, M. K.**, & Vlahos, L.: Variability of the Occurrence Frequency of Solar Flares and the Statistical Flare, Proc. of the 6^{th} European and 3^{rd} Hellenic Astronomical Conference, Abstract, p39, 1997

7. Crosby, N., **Georgoulis, M.** & Vilmer, N.: A Comparison bewteen Statistical Properties of X-Ray Flares and Predictions of the Statistical Flare Model, Paris, France, 22-25 June 1999 (ESA SP-446), pp247-250, October, 1999

14.4 In Preparation

1. **Georgoulis, M. K.**, Vilmer, N. & Crosby N. B.: A Comparison Between the Statistical Properties of Solar X-Ray Bursts and Avalanches in the Statistical Flare Models, *Astron. Astroph.*, 2000

2. Walsh, R. W. & **Georgoulis, M. K.**: Microflare and Nanoflare Heating of Active Region Loops, *Astron. Astroph.*, 2000

15 Future Plans

In the context of a Post-Doctoral fellowship, the topics of my interest are the following:

1) The link between the simplified Cellular Automata rules and MHD Equations. This goal will be in favor of the emergence of a refined modeling that will reconcile the flavor of MHD with statistical models and upgrade statistics as a complementary tool of understanding the energy release process in the solar corona.

2) An extensive statistical comparison between satellite data and statistical models. The amount of information gathered by satellite-based observations concerning the solar coronal evolution offers unique opportunities of investigating many aspects of the behaviour of the real system, yet untouched.

3) A possible widening of applications of self-organization and fractal behaviour in other complex astrophysical systems. Timeseries analysis as well as fractality in space and time provides nowadays new grounds for research in topics like space-weather forecasting and magnetospheric applications.

16 References

- References can be requested by:

  1. *Prof. Loukas Vlahos*, Section of Astrophysics, Astronomy & Mechanics, Department of Physics, Aristotle University of Thessaloniki, GR-54006, Thessaloniki, Greece e-mail:vlahos@astro.auth.gr
  2. *Prof. Nicole Vilmer*, LPSH, URA 2080 CNRS, DASOP Observatoire de Paris, Section d' Astrophysique de Meudon, 5 Place Janssen, F-92195 Meudon Cedex, France e-mail:Nicole.Vilmer@obspm.fr
  3. *Prof. Giorgio Einaudi*, Dipartimento di Fisica, Università di Pisa, 56100 Pisa, Italy e-mail:einaudi@difi.unipi.it