Dr. Viktor Fedun (PhD FHEA)

Personal Details

Department of Automatic Control
and Systems Engineering
The University of Sheffield
[redacted]

Nationality: British
Email: [redacted]
URL: [redacted]

Education

1993–1998	Ph.D. in Heliophysics and Physics of the Solar System, National Taras Shevchenko University, Physics Faculty, Kiev, Ukraine, Thesis: "Nonlinear parametric wave interactions in the near Earth plasma"
1989–1994	Physics, M.Sci, 1994, National Taras Shevchenko University, Physics faculty, Kiev, Ukraine Degree: Excellent (highest on scale)
1984-1989	Secondary school 117, Kiev, Ukraine, Gold Medal distinction

Present and previous employment

2018 -	Senior Lecturer in Control and Systems Engineering, ACSE, The University of Sheffield, UK
2012 -2018	Lecturer in Control and Systems Engineering, ACSE, The University of Sheffield, UK
2005 - 2012	STFC Rolling Grant PDRA, SoMaS, The University of Sheffield, UK
1998 - 2004	Senior Research Fellow (member of staff), Space Physics Department, Kiev National University; Main Astronomical Observatory NASU, Space Plasma Physics Department, Kiev, Ukraine
2000 – 2004	Chief Computing Officer, Scientific and Production Center "Viateh", Kiev, Ukraine
1994 – 1998	Research Officer, Kiev National University, Space Physics Department, Kiev, Ukraine

Research interests and qualifications My research is devoted to the mathematical modelling of dynamical processes in the solar and space plasmas, energy transfer mechanisms in the Sun-Earth system, understanding of the Earth electromagnetic environment and its relationship with the sources of natural hazards, i.e. solar energetic events, earthquakes, volcano, tsunamis, tornados etc. The study of processes occurring in such systems is crucially important for understanding the Sun, predicting Space Weather and Earth natural disasters. In my research I combine analytical theory, numerical modelling and data analysis. My strong background in applied mathematics and physics (MSc and PhD) allows me to apply analytical and numerical methods from complex analysis, differential equations, hydro- and magnetohydrodynamics (MHD) to various problems arising from the observations of space, laboratory and technological plasmas. My main research interests also include MHD (non)linear analytical theory and 2-3D numerical modelling of a wide range of nonlinear plasma processes (i.e. plasma instabilities, turbulence, mode conversion etc.).

Guest Editor 2016 Advances in Space Research; 2015 Journal of Astronomy and Astrophysics; 2018, 2014 Annales Geophysicae.

Publications Author/co-author of more than 90 scientific papers in international and national scientific refereed journals such as **Nature** (Citation Impact Factor 36.1), **Science** (29.747), **The Astrophysical Journal** (7.364), **Astronomy and Astrophysics** (4.179), **Solar Physics** (3.628), **Journal of Geophysical Research** (3.475), **Physics and Chemistry of the Earth** (1.7) and other refereed journals.

Member: European Geosciences Union, EGU, American Geophysical Union, AGU

Recent publications (2015-2019 only, selected)

Gent, F., Snow, B., **Fedun, V**., Erdélyi, R. Modelling 3D magnetic networks in a realistic solar atmosphere. MNRAS, 2019

González-Avilés, J. J., Guzmán, F. S., **Fedun, V**. G. Verth, Sharma, R., S. Shelyag, S. Regnier, Analysis of 3D plasma motions in a chromospheric jet formed due to magnetic reconnection, 2018, MNRAS, 2019
Onishchenko, O., **Fedun, V.,** Horton, W., Pokhotelov, O., and Verth, G., Dust devils: structural features, dynamics and climate impact, Climate MDPI, 2019
Giagkiozis, I., **Fedun, V.**, Scullion, E., Jess, D. B., Verth, G. Vortex Flows in the Solar Atmoshpere: Automated Identification and Statistical Analysis,The Astrophysical Journal, 869, 2018
Cheremnykh, O. K., **Fedun, V.**, Ladikov-Roev, Yu., Verth, G., On the Stability of Incompressible MHD Modes in Magnetic Cylinder with Twisted Magnetic Field and Flow, The Astrophysical Journal, 866, 2018
Shelyag, S., Litvinenko, **Fedun, V.**, Verth, G., González-Avilés, J. J. and Guzmán, F. S.
Flows and magnetic field structures in reconnection regions of simulations of the solar atmosphere: do flux pile-up models work? Astronomy & Astrophysics, 620, 2018
Leonard, A. J., Mumford, S. J., **Fedun, V.,** and Erdélyi, R. Varying Driver Velocity Fields in Photospheric MHD Wave Simulations, MNRAS, 2018
Onishchenko, O. G., Horton, W., Smolyakov, A., **Fedun, V**., Pokhotelov, O. A., and Verth, G. ,Tornado model for a magnetised plasma, Physics of Plasmas, 2018
González-Avilés, J. J., Guzmán, F. S., **Fedun, V.** G. Verth, S. Shelyag, S. Regnier, I. Jet Formation and Evolution due to 3D Magnetic Reconnection, The Astrophysical Journal, 836, 2018
Snow, B., **Fedun, V.**, Gent, F. A., Verth, G., Erdélyi, R., Magnetic shocks and substructures excited by torsional Alfvén wave interactions in merging expanding flux tubes,The Astrophysical Journal, 857, 2018
Fedun, V., Srivastava, A. K. MHD Wave Phenomena in the Solar Interior and Atmosphere.
Preface for special issue of Advances in Space Research, Advances in Space Research, 2017
Griffiths, M.K., **Fedun, V.**, Erdélyi, R., Zheng, R. Solar Atmosphere Wave Dynamics Generated by Solar Global Oscillating Eigenmodes, Advances in Space Research, 2018
Murawski, K., Kayshap, P., Srivastava, A. K., Pascoe, D. J., Jelínek, P., Kuźma, B., **Fedun, V.** Magnetic swirls and associated fast magnetoacoustic kink waves in a solar chromospheric flux tube
MNRAS, 474, 77-87 2018
Krishna Prasad, S., Jess, D., Van Doorsselaere, T., Verth, G., Morton, R., **Fedun, V**., Erdélyi, R., Christian, D. J., The Frequency-dependent Damping of Slow Magnetoacoustic Waves in a Sunspot Umbral Atmosphere, The Astrophysical Journal, 847, 1, 2017
Jess, D., Van Doorsselaere, T., Verth, G., **Fedun, V.**, Krishna Prasad, S., Erdélyi, R., Keys, P. H., Grant, S. D. T., Uitenbroek, H., Christian, Damian J. An Inside Look at Sunspot Oscillations with Higher Azimuthal Wavenumbers The Astrophysical Journal, 842, 1, 2017
Cheremnykh, O. K., **Fedun, V.,** Kryshtal, A. N., and Verth, G. Incompressible MHD modes in the thin magnetically twisted flux tube, Astronomy & Astrophysics, 2017
Alvarez Gonzalez, F., Badilita, A-M., Baker, A., Cho, Y-H., Dhot, N., **Fedun, V.**, Hare, C., He, T., Hobbs, M., Javed, M., Livesey, H., Lord, C., Panoutsos, G., Permyakov, A., Pope, S., Portnell, M., Rhodes, L., Sharma, R., Taras, P., Taylor, J., Tilbrook, R., Verth, G., Wrigley, S., Yaqoob M., Cook, R., McLaughlin, J., Morton, R., Scullion, E., Shelyag, S., Hamilton, A., Zharkov, S., Jess, D., Wrigley, M.
Project SunbYte: solar astronomy on a budget
Astronomy and Geophysics, 58, 2, 2017 Gonzalez-Aviles, J. J., Guzman, F. S., **Fedun, V.,** Jet Formation in Solar Atmosphere due to Magnetic Reconnection, ApJ, 836, 2017
Rapoport, Yu., Cheremnykh, O., Koshovy, V., Melnik, M., Ivantyshyn, O., Nogach, R., Selivanov, Yu., Grimalsky, V., Mezentsev, V., Karataeva, L., Ivchenko, V., Milinevsky, G., **Fedun, V.,** and Tkachenko, E. Ground-based acoustic parametric generator impact on the atmosphere and ionosphere in an active experiment, Annales Geophysicae, 35, 53-70, 2017
Onishchenko, O., Horton, W., Pokhotelov, O. and **Fedun, V.** Explosively growing vortices of unstably stratified atmosphere, Journal of Geophysical Research, 2016
Horton, W., Miura, H., Onishchenko, O., Couedel, L., Arnas, C., Escarguel, A., Benkadda, S. and **Fedun, V.** Dust devil dynamics Journal of Geophysical Research, 2016
Giagkiozis, I., Goossens, M., Verth, G., **Fedun,** V., Van Doorsselaere, T., Resonant Absorption of Axisymmetric Modes in Twisted Magnetic Flux Tubes, The Astrophysical Journal, 2016Solovieva, M., Rozhnoi, A., **Fedun, V.,** Schwingenschuh, K., Effect of the Total Solar Eclipse of March 20, 2015, on VLF/LF Propagation, Geomagnetism and Aeronomy, 56, 3, 323-330, 2016
Williams, T., Taroyan, Yu., **Fedun, V.,** The Non-linear Evolution of a Twist in a Magnetic Shocktube
The Astrophysical Journal, 817, 2016
Onishchenko, O., Pokhotelov, O., Horton, W., Scullion, E., **Fedun, V.,** Large-scale Alfvén vortices

Physics of Plasmas, 22, 122901

Solovieva, M., Rozhnoi, A., **Fedun, V.,** Schwingenschuh, K. Hayakawa, M., Ionospheric perturbations related to the earthquake in Vrancea area on November 22, 2014, as detected by electromagnetic VLF/LF frequency signals, Annales Geophysicae, 58, 5, A0552, doi:10.4401/ag-6827, 2015

Onishchenko, O., Pokhotelov, O., Horton, W., **Fedun, V.**, Dust devil vortex generation from convective cells Annales Geophysicae, 33, pp.1343-1347, 2015

Kryshtal, A., **Fedun, V.,** Gerasimenko, S., Voitsekhovska, A., Oblique Bernstein Mode Generation Near the Upper-hybrid Frequency in Solar Pre-flare Plasmas, Solar Physics, 2015

Giagkiozis, I., **Fedun, V.,** Verth, G., Erdélyi, R., Axisymmetric Modes in Magnetic Flux Tubes with Internal and External Magnetic Twist, The Astrophysical Journal, 2015

Griffiths, M. K., Fedun, V., Erdélyi, R., A Fast MHD Code for Gravitationally Stratified Media using Graphical Processing Units: SMAUG, Journal of Astrophysics and Astronomy, 2015

Fedun, V., Erdélyi, R., Srivastava, A. K., Pandey, J. C., Editorial, Journal of Astrophysics and Astronomy, 2015

Grant, S. D. T., Jess, D. B., Moreels, M. G., Morton, R. J., Christian, D. J., Giagkiozis, I., Verth, G., **Fedun, V.,** Keys, P.H., Van Doorsselaere, T., Erdélyi, R., Wave Damping Observed in Upwardly Propagating Sausage-mode Oscillations contained within a Magnetic Pore, The Astrophysical Journal, 2015

Rozhnoi, A., Solovieva, M., Parrot, M., Hayakawa, M., Biagi, P.-F., Schwingenschuh, K., **Fedun, V.** VLF/LF signal studies of the ionospheric response to strong seismic activity in the Far Eastern region combining the DEMETER and ground-based observations, Physics and Chemistry of the Earth, 2015

Jess, D.B., Morton, R.J., Verth, G., **Fedun, V.,** Grant, S.D.T., Giagkiozis, I., Multiwavelength Studies of MHD Waves in the Solar Chromosphere. An Overview of Recent Results, Space Science Reviews, 2015

Mumford, S., **Fedun, V.,** Erdélyi, R., Generation of Magnetohydrodynamic Waves in Low Solar Atmospheric Flux Tubes by Photospheric Motions, The Astrophysical Journal, 799, 2015