

Dr Antoine STRUGAREK

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Post-doctoral researcher

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Professional Experience

- Mar 13 - **Canada** **Post doctoral researcher**
Université de Montréal, *Solar Physics Research Group*
Co-supervision of two undergraduate students
- Sep 12 - Dec 12 **Teaching**
Sep 10 - Dec 10 **France** Université Paris-Diderot, Paris – INSTN, Saclay
80 teaching hours in basic physics and astrophysics, undergraduate and graduate level
- Mar 09 - Jul 09 **France** **Graduate degree internship**
CEA - Cadarache center.
Theoretical and numerical modeling of gyrokinetic turbulence in tokamaks with a 5D code
- May 08 - Jul 08 **Canada** **Internship in applied mathematics**
Polytechnique Montréal
Implementation of a 3D discontinuous Galerkin finite element solver (Fortran)

Education

- Jul 13 **Austria** **Alpbach Summer School on Space Climate**
Mission concept published in [Strugarek, et al., Space Weather and Space Climate, 5, A4](#)
- Oct 09 - Dec 12 **France** **PhD in plasma physics - themes: stellar astrophysics, fusion**
Commissariat à l'Énergie Atomique (CEA), Saclay and Cadarache centers
Transport, turbulence and confinement: from tokamaks to stellar magnetism
PhD defended in November 19th, 2012 with highest honor
- Sep 06 - Sep 09 **France** **Ecole Nationale Supérieure de Techniques Avancées (ENSTA Paris Tech)**
Engineering school, Broad curriculum in Mathematics and Fluid Dynamics
Master Degree in Modelisation and Simulation, INSTN, Saclay
Specialization in fluid dynamics and High Performance Computations, *Mention Très Bien*

Languages & Computing Skills

- French** Native
- English** Fluent (TOEIC: 985/990)
- I.T.** C, Fortran, MPI, OpenMP, Python, IDL, Matlab
Official collaborator: [PLUTO](#), [yt](#)

Grants & Prizes

- 2016 - **CNES** postdoctoral fellowship
- 2014 - 2016 **CITA National Fellow** (postdoctoral fellowship)
- 2014 - 2015 **Merit postdoctoral fellowship for foreign students** ([MELS](#))
- 2013 **Best thesis of 2013 prize** from the french Astronomy and Astrophysics society

Selected Publications

- 2016 **Strugarek et al.**, *Advances in Space Research*, in press
Modelling turbulent stellar convection zones: sub-grid scales effects
- 2015 **Strugarek et al.**, *The Astrophysical Journal*, **815**, 111
Magnetic games between a planet and its host star: the key role of topology
- 2014 **Strugarek, et al.** *The Astrophysical Journal*, **795**, 86
On the diversity of magnetic interactions in close-in star-planet systems
- 2014 **Strugarek & P Charbonneau**, *Solar Physics*, **289**, 11, 4137
Predictive capabilities of avalanche models for solar flares
- 2014 **Strugarek, P Charbonneau, et al**, *Solar physics*, **289**, 8, 2993
Deterministically Driven Avalanche Models of Solar Flares
- 2013 A S Brun, M Browning, M Dikpati, H Hotta and **Strugarek**, *Space Science Reviews*, 1-36
Recent Advances on Solar Global Magnetism and Variability
- 2011 **Strugarek**, A S Brun and J-P Zahn, *Astronomy & Astrophysics* **532**, 34
Magnetic confinement of the solar tachocline: II. Coupling to a convection zone

International conferences & Seminars

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|--------------|--|-----------------------------|
| Jun 2016 | <i>AstroFluids</i> , Observatoire de Paris, France | Invited talk |
| Dec 2015 | <i>Dynamo effect workshop</i> , Princeton University, USA | |
| Jul 2015 | <i>Festival de théorie</i> , Aix-en-Provence, France | |
| Jun 2015 | <i>Solar Dynamo Frontiers Workshop</i> , Boulder, USA | |
| Nov 2014 | <i>Star-planet interactions and the H-Z</i> , Saclay, France | |
| Oct 2014 | <i>Space weather of the early Sun Workshop</i> , Tucson, USA | |
| Sep 2014 | <i>First SPIRou Science Workshop</i> , Paris, France | |
| Sep 2013 | <i>Self-Organized Criticality & Turbulence</i> , Bern, Switzerland | |
| Sep 2012 | <i>Helioseismology and Dynamics of the Solar Interior</i> , Bern | |
| Aug 2012 | <i>Theory of Fusion Plasmas</i> , Varenna, Italy | |
| Jun 2014 | <i>Cool Stars 18</i> , Flagstaff, USA | Plenary session talk |
| Aug 2015 | <i>IAU General Assembly</i> , Hawaii, USA (3 talks) | Contributed talk |
| Mar 2014 | <i>Wave-Mean Flow Interactions in Fluids</i> , KITP, USA | |
| Oct 2013 | <i>Canadian Solar Workshop</i> , La petite rouge, Canada | |
| Jul 09-11-13 | <i>Festival de théorie</i> , Aix-en-Provence, France | |
| Jun 2013 | <i>IAUS 300</i> , Paris, France | |
| May 2013 | <i>Large eddy simulations of MHD turbulence</i> , Boulder, USA | |
| Oct 2011 | <i>Stellar magnetism and extra-solar planets</i> , OHP, France | |
| Aug 2011 | <i>Magnetic fields in stars and exoplanets</i> , Potsdam, Germany | |
| Feb 2015 | <i>CITA</i> , Toronto, Canada | Seminar |
| Dec 2014 | <i>Lab. de Physique des Plasmas</i> , Ecole polytechnique, France | |
| Dec 2014 | <i>Observatoire de Paris</i> , Meudon, France | |
| Oct 2013 | <i>McGill University</i> , Montréal, Canada | |
| Dec 2012 | <i>Université de Montréal</i> , Canada | |
| Mar 2012 | <i>HAO colloquium</i> , Boulder, USA | |

Complete list of publications

Submitted/To Appear

- 2016 Varela, **Strugarek** & Brun, accepted in Advances in Space Research
Differential rotation and magnetism in solar-like stars

Peer-reviewed publications (11 as first author)

- 2016 **Strugarek et al.**, Advances in Space Research, in press
Modelling turbulent stellar convection zones: sub-grid scales effects
- 2015 **Strugarek et al.**, The Astrophysical Journal, **815**, 111
Magnetic games between a planet and its host star: the key role of topology
- 2015 Réville, Brun, **Strugarek**, et al., The Astrophysical Journal, **814**, 99
From solar to stellar corona: the role of wind, rotation and magnetism
- 2015 Lawson, **Strugarek*** and Charbonneau, The Astrophysical Journal, **813**, 95 *corresponding author
Evidence of active MHD instability inside EULAG-MHD simulations of solar convection
- 2015 Alvan, **Strugarek**, et al., Astronomy & Astrophysics, **581**, 112
Characterizing the propagation of gravity waves in 3D nonlinear simulations of solar-like stars
- 2015 **Strugarek**, et al., Space Weather and Space Climate, **5**, A4
A Space Weather Mission Concept: Observatories of the Solar Corona and Active Regions (OSCAR)
- 2015 Réville, [...], **Strugarek**, The Astrophysical Journal, **798**, 116
The effect of magnetic topology on thermally-driven winds: towards a general formulation of the braking law
- 2014 **Strugarek**, et al. The Astrophysical Journal, **795**, 86
On the diversity of magnetic interactions in close-in star-planet systems
- 2014 **Strugarek** & Charbonneau, Solar Physics, **289**, 11, 4137
Predictive capabilities of avalanche models for solar flares
- 2014 Aschwanden, [...], **Strugarek**, et al., Space Science Reviews, 29
25 Years of Self-Organized Criticality: Solar and Astrophysics
- 2014 **Strugarek**, Charbonneau, et al, Solar Physics, **289**, 8, 2993
Deterministically Driven Avalanche Models of Solar Flares
- 2013 Brun, Browning, Dikpati, Hotta and **Strugarek**, Space Science Reviews, 1-36
Recent Advances on Solar Global Magnetism and Variability
- 2013 **Strugarek**, et al., Physical Review Letters, **111**, 145001
Unraveling quasi-periodic relaxations of transport barriers with gyrokinetic simulations
- 2013 **Strugarek**, et al, The Astrophysical Journal, **764**, 189
Magnetic energy cascade in spherical geometry: I. The stellar convective dynamo case
- 2013 **Strugarek**, et al., Plasma Physics and Controlled Fusion, **55**, 7
Ion transport barriers triggered by plasma polarization in gyrokinetic simulations
- 2012 Garbet, Abiteboul, **Strugarek**, et al., Plasma Physics and Controlled Fusion, **54**, 5
Thermodynamics of neoclassical and turbulent transport
- 2011 **Strugarek**, Brun and Zahn, Astr. Nach./ AN, **332**, No. 9/10, 891
Magnetic confinement of the solar tachocline: The oblique Dipole
- 2011 **Strugarek**, Brun and Zahn, Astronomy & Astrophysics **532**, 34
Magnetic confinement of the solar tachocline: II. Coupling to a convection zone
- 2011 Abiteboul, [...], **Strugarek**, et al, Physics of Plasmas, **18**, 8
Conservation equations and calculation of mean flows in gyrokinetics

Conference proceedings (8 as first author)

- 2015 **Strugarek**, et al, Proceedings de l'IAUS 321 (Assemblée Générale de l'IAU),
3D magnetic interactions of stars with their close-in planets
- 2015 **Strugarek**, et al, Proceedings du FM 1 (Assemblée Générale de l'IAU),
Close-in planet migration due to magnetic torques

- 2015 **Strugarek** & Charbonneau, Proceedings du FM 18 (Assemblée Générale de l'IAU),
Predicting large solar flares with data assimilation
- 2014 **Strugarek**, *et al*, Comptes rendus **SF2A-2014**
Modelling the Corona of HD 189733 in 3D
- 2014 **Strugarek**, *et al*, Proceedings of the CoolStars 18 meeting
Numerical aspects of 3D stellar winds
- 2014 **Strugarek**, *et al*, Proceedings of the IAUS300 meeting, **300**, 330
Modelling magnetized star-planet interactions: boundary conditions effects
- 2013 Brun, Alvan, **Strugarek**, Mathis, Garcia, JoP: Conference Series **440**
On gravity waves in the Sun
- 2012 **Strugarek**, Brun and Matt, Comptes rendus **SF2A-2012**, 419
On close-in magnetized star-planet interaction
- 2012 Brun and **Strugarek**, 3rd Hinode Science Meeting, ASP Conf. Series, **454**, 3
Understanding the Solar Inner Magnetism and Dynamics
- 2011 **Strugarek**, Brun and Zahn, Proceedings of the IAU **271**, 399
Magnetic confinement of the solar tachocline: Influence of turbulent convective motions
- 2010 Sarazin, **Strugarek**, *et al.*, Journal of Physics: Conference Series **260**, 2010
Flux-driven gyrokinetic simulations of ion turbulent transport at low magnetic shear

Public outreach

- 2014 Wired Science Graphic of the Week (13/11/2014): Magnetic Stars and Planets
- 2012 Sarazin, Grandgirard and **Strugarek**, La Recherche - Supercalculateurs **469**
La Fusion bientôt sous contrôle

Published as co-author

- 2015 Grandgirard, [...], **Strugarek**, *et al.*, HAL, 2015 <cea-01153011v2>
A 5D gyrokinetic full-f global semi-lagrangian code for flux-driven ion turbulence simulations
- 2014 Ghendrih, [...], **Strugarek**, *et al.*, EPJE, **37**, 27
Fusion plasma turbulence described by modified sandpile dynamics
- 2013 Dumont, Zarzoso, Sarazin, Garbet, **Strugarek**, *et al.*, PPCF, **55**, 12
Interplay between fast ions and turbulence in magnetic fusion plasmas
- 2013 Abiteboul, [...], **Strugarek**, *et al.*, Plasma Physics and Controlled Fusion, **55**, 7
Turbulent momentum transport in core tokamak plasmas and penetration of scrape-off layer flows
- 2013 Zarzoso, [...], **Strugarek**, *et al.*, Physical Review Letters, **110**, 125002
Impact of energetic-particle-driven geodesic acoustic modes on turbulence
- 2012 Ku, [...], **Strugarek**, *et al.*, Nuclear Fusion, **52**, 6
Physics of intrinsic rotation in flux-driven ITG turbulence
- 2011 Sarazin, [...], **Strugarek**, *et al.*, Nuclear Fusion, **51**, 10
Predictions on heat transport and plasma rotation from global gyrokinetic simulations
- 2011 Dif-Pradalier, [...], **Strugarek**, *et al.*, Physics of Plasmas **18**, 6
Neoclassical physics in full distribution function gyrokinetics
- 2010 Dif-Pradalier, [...], **Strugarek**, *et al.*, Physical Review E **82**, 2
On the validity of the local diffusive paradigm in turbulent plasma transport
- 2010 Sarazin, [...], **Strugarek**, *et al.*, Nuclear Fusion, **50**, 5
Large scale dynamics in flux driven gyrokinetic turbulence