

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      Université Paris-Diderot, Paris – INSTN, Saclay  
**France**              80 *teaching hours in basic physics and astrophysics, undergraduate and graduate level*
- Mar 09 - Jul 09      **Graduate degree internship**  
**France**              CEA - Cadarache center.  
*Theoretical and numerical modeling of gyrokinetic turbulence in tokamaks with a 5D code*
- May 08 - Jul 08      **Internship in applied mathematics**  
**Canada**              Polytechnique Montréal  
*Implementation of a 3D discontinuous Galerkin finite element solver (Fortran)*

## Education

- Jul 13                  **Alpbach Summer School on Space Climate**  
**Austria**              Mission concept published in [Strugarek, et al., Space Weather and Space Climate, 5, A4](#)
- Oct 09 - Dec 12      **PhD in plasma physics - themes: stellar astrophysics, fusion**  
**France**              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      **Ecole Nationale Supérieure de Techniques Avancées (ENSTA Paris Tech)**  
**France**              *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

- |              |  |                             |
|--------------|--|-----------------------------|
| Jun 2016     | <i>AstroFluids</i> , Observatoire de Paris, France                     | <b>Invited talk</b>         |
| 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 &amp; 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                                  | <b>Plenary session talk</b> |
| Aug 2015     | <i>IAU General Assembly</i> , Hawaii, USA (3 talks)                    | <b>Contributed talk</b>     |
| 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  | <b>Seminar</b>              |
| 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*