Damien **Minenna**

Ph.D. in Physics | Modelling | Scientific Computing
Electrodynamics | Plasma Physics | Vacuum Electronics Tubes
Research Engineer at CEA, Bruyères-le-Chatel, France

8 publications and 19 conferences

List of publications

Thesis

[1] D. F. G. Minenna, *Modélisation hamiltonienne N-corps de l'échange de moment dans l'interaction onde-particule non-linéaire*, (Ph.D. thesis, Aix-Marseille Université, 2019), url : https://tel.archives-ouvertes.fr/tel-02479923v1.

Peer-reviewed publications

2018

[2] Electromagnetic power and momentum in N-body Hamiltonian approach to wave-particle dynamics in a periodic structure
D. F. G. Minenna, Y. Elskens, F. André and F. Doveil
Europhysics Letters (EPL), **122**(4): 44002 (7pp) (2018), doi: 10.1209/0295-5075/122/44002.

2019

[3] The traveling-wave tube in the history of telecommunication
D. F. G. Minenna, F. André, Y. Elskens, J-F. Auboin, F. Doveil, J. Puech and É. Duverdier
The European Physical Journal H, **44**(1): 1-36 (2019), doi: 10.1140/epjh/e2018-90023-1.
Front cover of the journal issue.
Press article: "Traveling-wave tubes : The unsung heroes of space exploration", by Abigail Beall. Available on Springer.com, EPJH Highlight, EurekAlert!, ScienceDaily.com, and Phys.org.
Press article: "What are traveling-wave tubes and how important are they in space exploration?", by Edsel Cook on Space.news.
Press article: "Highlights", *Europhysics News (EPN)*, **50**(3): 9 (2019), url: europhysicsnews.org/vol-50-no-3-highlights.

[4] Recent discrete model for small-signal analysis of traveling-wave tubes
D. F. G. Minenna, A. G. Terentyuk, Y. Elskens, F. André and N. M. Ryskin
Physica Scripta, **94**(5): 055601 (8pp) (2019), doi: 10.1088/1402-4896/ab060e.

[5] DIMOHA: a time-domain algorithm for traveling-wave tube simulations
D. F. G. Minenna, Y. Elskens, F. André, A. Poyé, J. Puech and F. Doveil
IEEE Transaction on Electron Devices, **66**(9): 4042-4047 (2019), doi:10.1109/TED.2019.2928450.

2020

[6] Electromagnetic momenta for wave-particle systems in vacuum waveguides: Universality of the Abraham-Minkowski dilemma for photon momenta beyond dielectric materials
D. F. G. Minenna, Y. Elskens, F. Doveil and F. André
The European Physical Journal D, **74**(5): 103 (2020), doi: 10.1140/epjd/e2020-100640-6.

[7] Impact of the target holder on return currents and GHz electromagnetic pulses in short-pulse laser interactions
D. F. G. Minenna, A. Poyé, P. Bradford, N. Woolsey and V. T. Tikhonchuk
Physics of Plasmas, **27**(6): 063102 (2020), doi: 10.1063/5.0006666.

[8] Technology and Assembly of a W-band Traveling Wave Tube for New 5G High Capacity Networks
F. André, J-C. Racamier, R. Zimmermann, T. Le, V. Krozer, G. Ulisse, D. F. G. Minenna, R. Letizia and C. Paoloni
IEEE Transaction on Electron Devices, **67**(7): 2919 - 2924 (2020), doi: 10.1109/TED.2020.2993243.

2021

[9] Nonstationary discrete theory of excitation of periodic structures and its application for simulation of traveling-wave tubes (in Russian)
N. M. Ryskin, A. G. Rozhnev, D. F. G. Minenna, Y. Elskens and F. André
Izvestiya VUZ. Applied Nonlinear Dynamics, **29**(1): 10-34 (2021), doi: 10.18500/0869-6632-2021-29-1-10-34.

Soon to be submitted

[10] Time simulation of the nonlinear wave-particle interaction in meters long traveling-wave tubes
D. F. G. Minenna, K. Aliane, Y. Elskens, A. Poyé, F. André, J. Puech and F. Doveil

Conferences (Speaker)

2017

[11] Hamiltonian description of electron-wave interaction for time domain simulations applied to traveling-wave tubes **(Poster)**
D. F. G. Minenna, Y. Elskens and F. André
9th ITER International School (IIS 2017), Aix-en-Provence, France, March 2017.

[12] Electron-wave momentum exchange and time domain simulations applied to traveling wave tube **(Oral)**
D. F. G. Minenna, Y. Elskens and F. André
18th IEEE International Vacuum Electronics Conference (IVEC 2017), London, U.K., April 2017.
Proceedings: *Proceedings of the 18th IEEE Int. Vac. Elec. Conf.* (IEEE, Piscataway, NJ, 2017), doi: 10.1109/IVEC.2017.8289689.

[13] Degree-of-freedom reduction for nonlinear N-body wave-particle interaction **(Poster)**
D. F. G. Minenna, Y. Elskens and F. André
Collisionless Boltzmann (Vlasov) Equation and Modeling of Self-Gravitating Systems and Plasmas, CIRM, Marseille, France, October 2017.

2018

[14] Wave-Particle Interaction studied in a Traveling Wave Tube **(Invited oral)**
F. Doveil, Y. Elskens and D. F. G. Minenna
19th International Congress on Plasma Physics (ICPP 2018), Vancouver, Canada, June 2018.

[15] Interaction onde-particule et modélisation en domaine temps des tubes à ondes progressives **(Poster)**
D. F. G. Minenna, F. André, F. Doveil, Y. Elskens and J. Puech
18e Journées CNES Jeunes Chercheurs (JC2), Toulouse, France, October 2018.

2019

[16] Description N-corps de l'interaction onde-particule dans une structure périodique **(Poster)**
D. F. G. Minenna, Y. Elskens, F. André, A. Poyé and F. Doveil
22e Rencontre du Non-Linéaire, Paris, France, March 2019.
Proceedings: *Comptes-rendus de la 22e Rencontre du Non Linéaire (RNL), Paris 2019 (Non-Linéaire Publications, Saint-Étienne du Rouvray, 2019)*, p. 45-50, url: http://nonlineaire.univ-lille1.fr/SNL/comptes-rendus/2019/.

[17] DIMOHA: Traveling-wave tube simulations including band edge and multiple-carriers operations **(Oral)**
D. F. G. Minenna, Y. Elskens, F. André, J. Puech, A. Poyé, F. Doveil and T. Pereira
20th IEEE International Vacuum Electronics Conference (IVEC 2019), Busan, South Korea, April 2019.
Proceedings: *Proceedings of the 20th IEEE Int. Vac. Elec. Conf.* (IEEE, Piscataway, NJ, 2019), doi: 10.1109/IVEC.2019.8744984.

[18] Many body description of the wave-particle interaction **(Oral)**
D. F. G. Minenna, Y. Elskens, F. André, J. Puech, A. Poyé and F. Doveil
Annual Scientific Meeting of ED 352, Marseille, France, June 2019.

[19] Nonlinear wave-particle interaction in helix traveling-wave tubes using N-body simulations in time domain **(Oral)**
D. F. G. Minenna, Y. Elskens, F. Doveil, F. André, and A. Poyé
46th European Physical Society Conference on Plasma Physics (EPS 2019), Milan, Italia, July 2019.
Proceedings: EPS2019-O3.402 (4pp).

[20] Practical applications of the self-consistent hamiltonian N-body approach for wave-particle interactions **(Oral)**
D. F. G. Minenna, Y. Elskens, F. Doveil, A. Poyé and F. André
6th International Workshop on the Theory and Applications of the Vlasov Equation (VLASOVIA 2019), Strasbourg, France, July 2019, fellowship earned from the organization.

[21] Impact du temps de chargement des cibles par lasers et du courant de neutralisation sur les impulsions électromagnétiques GHz **(Poster)**
D. F. G. Minenna, A. Poyé and V. T. Tikhonchuk
Forum Interaction Laser Plasma 2019 (Forum-ILP 2019), Fréjus, France, October 2019.

[22] Observation and simulation of wave particle interaction in a Traveling Wave Tube upgrade **(Authors' withdraw)**
M.-C. De Sousa, D. F. G. Minenna, F. Doveil, and Y. Elskens,
61st Annual Meeting of the APS Division of Plasma Physics, Fort Lauderdale, Florida, October 2019.

2020

[23] Progress with DIMOHA for fast time-domain simulations of traveling-wave tubes **(Oral)**
F. André, D. F. G. Minenna, K. Aliane, Y. Elskens, A. Poyé, J. Puech and F. Doveil
21th IEEE International Vacuum Electronics Conference (IVEC 2020), Monterey, California, October 2020.

[24] Nonlinear plasma kinetic theory and applications to plasma instabilities **(Oral)**
D. Bénisti, O. Morice, M. Tacu, A. Debayle and D. Minenna,
4th Asia-Pacific Conference on Plasma Physics (AAPPS-DPP2020), remote e-conference, October 2020.

[25] Efficient many-body modeling of wave-particle interaction in a periodic structure **(Postponed conference)**
Y. Elskens, D. F. G. Minenna, F. André, A. Poyé, F. Doveil, M.-C. De Sousa, and K. Aliane,
International joint meeting of the 8th International Conference on Nonlinear Science and Complexity (NSC20-21) and the 4th International Conference on Chaos, Complexity and Transport (CCT20-21), Marseille, 2020.

[26] Applications d'un modèle hamiltonien à N corps de l'interaction onde-particule non-linéaire **(Postponed conference)**
D. F. G. Minenna, Y. Elskens, K. Aliane, M.-C. De Sousa, A. Poyé, F. André and F. Doveil,
16e Congrès de la division Plasmas de la Société Française de Physique SFP, Marseille, 2020.

[27] Modélisation de tubes à ondes progressives en domaine temporel avec une approche à N corps **(Postponed conference)**
K. Aliane, Y. Elskens, F. André and D. F. G. Minenna,
16e Congrès de la division Plasmas de la Société Française de Physique SFP, Marseille, 2020.

2021

[28] Time-domain non-linear simulations of a 3 meter long traveling wave tube
K. Aliane, D. F. G. Minenna, Y. Elskens, F. André and A. Poyé
21th IEEE International Vacuum Electronics Conference (IVEC 2021), submitted, remote e-conference, 2021.

[29] Méthode de tracé de rayon pour la résolution de l'interaction onde-onde multiple appliquée à la diffusion Raman stimulée **(Poster)**
D. F. G. Minenna, M. Tacu, D. Bénisti and A. Debayle
24e Rencontre du Non-Linéaire, Paris, France, accepted, March 2021.

Software deposit

2019

[30] DIMOHA
Certified by the Agence de Protection des Programmes (APP)
IDDN: IDDN.FR.001.110018.000.R.P.2019.000.20600
Invention disclosure: Damien Minenna 28%, Frédéric André 28%, Yves Elskens 28%, Alexandre Poyé 16%.

Workshop (1st author)

Feb 2017 Hamiltonian description of the electron-wave interaction and time domain simulations
Laboratoire de Physique des Interactions Ioniques et Moléculaires (PIIM), Aix-Marseille Université -CNRS, UMR 7345, Marseille, France

Mar 2017 Hamiltonian description of the electron-wave interaction and time domain simulation
Thales Electron Devices, Vélizy-Villacoublay, France

Oct 2017 A discrete model to study the electron-wave interaction and time domain simulations
Laboratoire de Physique des Interactions Ioniques et Moléculaires (PIIM), Sète, France

May 2018 Degree-of-freedom reduction & N-body Hamiltonian of the wave-particle interaction
Laboratoire de Physique des Interactions Ioniques et Moléculaires (PIIM), Aix-Marseille Université -CNRS, UMR 7345, Marseille, France

Jun 2018 Update on the Abraham-Minkowski dilemma
Laboratoire de Physique des Interactions Ioniques et Moléculaires (PIIM), Aix-Marseille Université -CNRS, UMR 7345, Marseille, France

Jun 2018 A discrete model to study the wave-particle interaction and time domain simulations
Thales Electron Devices, Vélizy-Villacoublay, France

Apr 2018 N-body self-consistent hamitonian approach for the wave-particle interaction in periodic structures and the Abraham-Minkowski dilemma in plasmas and waveguides
Centre de Physique Théorique (CPT), Aix-Marseille Université-Université de Toulon-CNRS, UMR 7332, Marseille, France

Feb 2020 Modélisation hamiltonienne à N-corps de l'échange de moment dans l'interaction onde-article
Commissariat à l'énergie atomique et aux énergies alternatives (CEA), Bruyères-le-Châtel, France

Oct 2020 Modélisation non-linéaire de l'interaction onde-particule dans un tube à ondes progressives de 3 mètres
Commissariat à l'énergie atomique et aux énergies alternatives (CEA), Gif-sur-Yvette, France

Peer review summary

Reviews for:

- *Semiconductor Science and Technology (Semicond. Sci. Technol.)*, IOP Publishing
- *The European Physical Journal Plus (Eur. Phys. J. P)*, Società Italiana di Fisica and Springer-Verlag
- *Physics of Plasmas (Phys. Plasmas)*, AIP Publishing

🏆 IOP Trusted Reviewer Award