Julien Dular

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born on July 18, 1995 in Liège

My research focuses on the numerical modelling of electromagnetic fields in the context of applied superconductivity. I am developing models in open-source software: Life-HTS (`http://www.life-hts.uliege.be/`), FiQuS (`https://steam.docs.cern.ch/tools/fiqus/`), GetDP, Gmsh.

Experience and Education

2026– now **Postdoctoral Researcher**, *F.R.S.-FNRS, University of Liège, Belgium*.
My research project focuses on the development of homogenization methods and reduced order models for high-temperature superconducting tapes, cables, and windings.

2023– now **Computational Physicist**, *CERN, Geneva, Switzerland*.
As an experienced project graduate at CERN, I am contributing to the development of a modern simulation framework (FiQuS) for the modelling of electro-thermal transients in accelerator magnets by developing novel finite element methods.

2018–2023 **PhD in Engineering Sciences**, *Research Fellow at F.R.S.-FNRS, University of Liège, Belgium*.
PhD thesis: Standard and mixed finite element formulations for systems with type-II superconductors. Advisors: Prof. Benoît Vanderheyden and Prof. Christophe Geuzaine. Manuscript submitted on January 3rd, 2023, and publicly defended on March 17th, 2023. Available: `https://orbi.uliege.be/handle/2268/298054`.

2016–2018 **Master in Engineering Physics**, *University of Liège, Belgium*, summa cum laude.
Master's thesis: Finite-element models for systems containing type-II superconductors and ferromagnetic materials. Supervisor: Prof. Benoît Vanderheyden.

2013–2016 **Bachelor in Engineering Sciences**, *University of Liège, Belgium*, summa cum laude.
Major option: Physics. Minor option: Mechanics.

Awards

2019 **Rita Trowbridge Prize 2019**.
One of the four finalists in the category for the best paper presented by a young researcher at Compumag conference in Paris, 2019.

2018 **Best Master's thesis in Engineering Physics 2018 AIM prize**.
The AIM is the association of engineers from the Montefiore institute in Liège.

2018 **Best Master's thesis in Engineering Physics 2018 AILg prize**.
The AILg is the association of engineers from the University of Liège.

2016 **Pisart educational support grant**.

2013 **Pisart entrance scholarship**.

Languages

French **Mother tongue**

English **Level C1**

Publications of the last five years

2026/03 **J. Dular**, A. Glock, A. Verweij, M. Wozniak, *Distributed inter-strand coupling current model for finite element simulations of Rutherford cables*, Superconductor Science and Technology, vol. 39, no. 3, pp. 1-31, Art no. 035006.

2026/03 J. Baumann, S. C. Hopkins, **J. Dular**, F. Magnus, M. Wozniak, J. D. Bijlsma, B. Medina-Clavijo, T. Boutboul, *Critical Current and Magnetization Scaling of Nb_3Sn Wires: Measurements and Simulations from Exact Wire Geometries*, IEEE Transactions on Applied Superconductivity, vol. 36, no. 5, Art no. 6001509.

2026/02 L. Denis, **J. Dular**, V. Nuttens, M. Wozniak, B. Vanderheyden, C. Geuzaine, *Acceleration of Multi-Scale LTS Magnet Simulations With Neural Network Surrogate Models*, IEEE Transactions on Applied Superconductivity, vol. 36, no. 5, Art no. 5900806.

2025/09 A. Glock, **J. Dular**, A. Verweij, M. Wozniak, *Reduced order hysteretic flux model for transport current homogenization in composite superconductors*, IEEE Transactions on Magnetics, 10.1109/TMAG.2025.3613877.

2025/09 A. Piwonski, **J. Dular**, R. V. Sabariego, R. S. Rezende, R. Schuhmann, *Efficient Finite Element Models for Milliken Conductors Using Homogenization Techniques Based on Helicoidal Symmetry*, IEEE Transactions on Magnetics, 10.1109/TMAG.2025.3612306.

2025/06 L. Soldati, **J. Dular**, J. Kovac, P. Kovac, M. Cialone, T. Spina, C.-E. Bruzek, M. Wozniak, M. Putty, M. Breschi, *Numerical and Experimental Investigation of AC Losses in MgB_2 Wires*, Superconductor Science and Technology, vol. 38, no. 6, pp. 1-19, Art no. 065019.

2025/02 **J. Dular**, A. Verweij, M. Wozniak, *Reduced order hysteretic magnetization model for composite superconductors*, Superconductor Science and Technology, vol. 38, no. 3, pp. 1-21, Art no. 035017.

2025/01 **J. Dular**, A. Verweij, M. Wozniak, *A finite element a-h-formulation for the reduced order hysteretic magnetization model for composite superconductors*, IEEE Transactions on Applied Superconductivity, vol. 35, no. 5, pp. 1-5, Art. no. 8200205.

2025/01 M. Wozniak, E. Schnaubelt, S. Atalay, B. Bordini, **J. Dular**, T. Mulder, E. Ravaioli, A. Verweij, *Influence of Critical Current Defect on Operation, Quench Detection and Protection of Conduction-Cooled Pancake REBCO Coil*, IEEE Transactions on Applied Superconductivity, vol. 35, no. 5, pp. 1-6, Art no. 4604006.

2024/12 **J. Dular**, F. Magnus, E. Schnaubelt, A. Verweij, M. Wozniak, *Simulation of Rutherford cable AC loss and magnetization with the coupled axial and transverse currents method*, IEEE Transactions on Applied Superconductivity, vol. 35, no. 5, pp. 1-5, Art no. 4700605.

2024/12 L. Soldati, **J. Dular**, M. Breschi, T. Spina, C.-E. Bruzek, *Analysis of AC Losses Due to Current Ripple in MgB2 Wires With Helicoidal Transformation Method*, IEEE Transactions on Applied Superconductivity, vol 35, no. 5, Art. no. 5901105.

2024/08 M. Houbart, J.-F. Fagnard, P. Harmeling, **J. Dular**, A.R. Dennis, D.K. Namburi, J.H. Durrell, C. Geuzaine, B. Vanderheyden, P. Vanderbemden, *Enhancing the magnetic field gradient between two superconductors with rotational motion under a background DC field*, Superconductor Science and Technology, vol 37, no. 9, Art no. 095009.

2024/07 **J. Dular**, F. Magnus, E. Schnaubelt, A. Verweij, M. Wozniak, *Coupled axial and transverse currents method for finite element modelling of periodic superconductors*, Superconductor Science and Technology, vol. 37, no. 9, pp. 1-17, Art no. 095002.

2024/06 **J. Dular**, F. Henrotte, A. Nicolet, M. Wozniak, B. Vanderheyden and C. Geuzaine, *Helicoidal Transformation Method for Finite Element Models of Twisted Superconductors*, IEEE Transactions on Applied Superconductivity, vol. 34, no. 7, pp. 1-15, Art no. 8200615.

2024/05 S. Atalay, E. Schnaubelt, M. Wozniak, **J. Dular**, G. Zachou, S. Schöps, A. Verweij, *An open-source 3D FE quench simulation tool for no-insulation HTS pancake coils*, Superconductor Science and Technology, vol 37, no. 6, Art no. 065005.

2024/02 **J. Dular**, S. Brialmont, P. Vanderbemden, C. Geuzaine and B. Vanderheyden, *Finite Element Models for Magnetic Shields Made of Stacked Superconducting Tape Annuli*, IEEE Transactions on Applied Superconductivity, vol. 34, no. 3, pp. 1-7, Art no. 4903507.

2023/12 E . Schnaubelt, S. Atalay, M. Wozniak, **J. Dular**, C. Geuzaine, B. Vanderheyden, N. Marsic, A. Verweij, S. Schöps, *Magneto-thermal thin shell approximation for 3D finite element analysis of no-insulation coils*, IEEE Transactions on Applied Superconductivity, vol. 34, no. 3, pp. 1-6, Art no. 4700406.

2023/12 M. Wozniak, E . Schnaubelt, **J. Dular**, E. Ravaioli, A. Verweij, *Quench co-simulation of canted cos-theta magnets*, IEEE Transactions on Applied Superconductivity, vol. 34, no. 3, pp. 1-5, Art no. 4900105.

2023/10 M. Houbart, J.-F. Fagnard, **J. Dular**, A.R. Dennis, D.K. Namburi, J.H. Durrell, C. Geuzaine, B. Vanderheyden, P. Vanderbemden, *How to overcome the demagnetization of superconducting Halbach arrays?*, Superconductor Science and Technology, vol 36, no. 11, 115012.

2023/09 A. Piwonski, **J. Dular**, R. S. Rezende and R. Schuhmann, *Finite-element modeling of power cables using coordinate transformations*, IEEE Transactions on Magnetics, vol. 60, no. 3, pp. 1-4, Art no. 7401104.

2023/04 S. Brialmont, **J. Dular**, L. Wéra, J.-F. Fagnard, B. Vanderheyden, C. Geuzaine, S. Hahn, A. Patel, P. Vanderbemden, *Magnetic shielding up to 0.67 T at 77 K using a stack of high temperature superconducting tape annuli of 26 mm bore*, Superconductor Science and Technology, vol. 36, no. 5, Art no. 054004.

2023/01 **J. Dular**, *Standard and mixed finite element formulations for systems with type-II superconductors*, PhD dissertation, University of Liège, Belgium.

2023/01 A. Piwonski, **J. Dular**, R. Silva Rezende, R. Schuhmann, *2D eddy current boundary value problems for power cables with helicoidal symmetry*, IEEE Transactions on Magnetics, vol. 59, no. 5, pp. 1-4, Art no. 6300204.

2022/05 M. Houbart, J.-F. Fagnard, **J. Dular**, A.R. Dennis, D.K. Namburi, J.H. Durrell, C. Geuzaine, B. Vanderheyden, P. Vanderbemden, *Trapped magnetic field distribution above a superconducting linear Halbach array*, Superconductor Science and Technology, vol. 35, no. 6, Art no. 064005.

2022/04 **J. Dular**, K. Berger, C. Geuzaine, B. Vanderheyden, *What Formulation Should One Choose for Modeling a 3D HTS Motor Pole with Ferromagnetic Materials?*, IEEE Transactions on Magnetics, vol. 58, no. 9, pp. 1-4, Art no. 8205204.

2021/07 **J. Dular**, M. Harutyunyan, L. Bortot, S. Schöps, B. Vanderheyden, C. Geuzaine, *On the Stability of Mixed Finite-Element Formulations for High-Temperature Superconductors*, IEEE Transactions on Applied Superconductivity, vol. 31, no. 6, pp. 1-12, Art no. 8200412.