

List of publications



Author: Ing. Jan Nikl
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Journal papers

- [1] M. Matys, S. V. Bulanov, M. Kucharik, M. Jirka, **J. Nikl**, M. Kecova, J. Proska, J. Psikal, G. Korn and O. Klimo. Plasma shutter for improved heavy ion acceleration by ultra-intense laser pulses. *New Journal of Physics*, 2022. Submitted.
- [2] **J. Nikl**, M. Kuchařík and S. Weber. High-order curvilinear finite element magneto-hydrodynamics I: A conservative Lagrangian scheme. *Journal of Computational Physics*, page 111158, 2022. doi:10.1016/j.jcp.2022.111158. In press.
- [3] L. Gaus, L. Bischoff, M. Bussmann, E. Cunningham, C. B. Curry, J. E. E. Galtier, M. Gauthier, A. L. García, M. Garten, S. Glenzer, J. Grenzer, C. Gutt, N. J. Hartley, L. Huang, U. Hübner, D. Kraus, H. J. Lee, E. E. McBride, J. Metzkes-Ng, B. Nagler, M. Nakatsutsumi, **J. Nikl**, M. Ota, A. Pelka, I. Prencipe, L. Randolph, M. Rödel, Y. Sakawa, H.-P. Schlenvoigt, M. Šmíd, F. Treffert, K. Voigt, K. Zeil, T. E. Cowan, U. Schramm and T. Kluge. Probing ultrafast laser plasma processes inside solids with resonant small-angle x-ray scattering. *Physical Review Research*, 3(4):043194, 2021. doi:10.1103/PhysRevResearch.3.043194.
■ Citations WOS: 1 Scopus: 1
- [4] **J. Nikl**, I. Göthel, M. Kuchařík, S. Weber and M. Bussmann. Implicit reduced Vlasov–Fokker–Planck–Maxwell model based on high-order mixed elements. *Journal of Computational Physics*, 434:110214, 2021. doi:10.1016/j.jcp.2021.110214.
■ Citations WOS: 1 Scopus: 0
- [5] J. Limpouch, V. Tikhonchuk, J. Dostal, R. Dudzak, M. Krupka, N. Borisenko, **J. Nikl**, A. Akunets, L. Borisenko and V. Pimenov. Characterization of the homogenization time of a plasma created by laser ionization of a low-density foam. *Plasma Physics and Controlled Fusion*, 62(3):035013, 2020. doi:10.1088/1361-6587/ab6b4d.
■ Citations WOS: 3 Scopus: 4

- [6] **J. Nikl**, M. Kuchařík, J. Limpouch, R. Liska and S. Weber. Wave-based laser absorption method for high-order transport–hydrodynamic codes. *Advances in Computational Mathematics*, 45(4):1953–1976, 2019. doi: 10.1007/s10444-019-09671-3.
 ■ Citations WOS: 0 Scopus: 3
- [7] R. Lokasani, H. Kawasaki, Y. Shimada, M. Shoji, K. Anraku, T. Ejima, T. Hatano, W. Jiang, S. Namba, **J. Nikl**, M. Zeman, G. O’Sullivan, T. Higashiguchi and J. Limpouch. Soft X-ray spectral analysis of laser produced molybdenum plasmas using fundamental and second harmonics of a Nd:YAG laser. *Optics Express*, 27(23):33351–33358, 2019. doi: 10.1364/OE.27.033351.
 ■ Citations WOS: 2 Scopus: 2
- [8] **J. Nikl**, M. Holec, M. Zeman, M. Kuchařík, J. Limpouch and S. Weber. Macroscopic laser-plasma interaction under strong non-local transport conditions for coupled matter and radiation. *Matter and Radiation at Extremes*, 3:110–126, 2018. doi:10.1016/j.mre.2018.03.001.
 ■ Citations WOS: 7 Scopus: 9
- [9] M. Holec, **J. Nikl** and S. Weber. Nonlocal transport hydrodynamic model for laser heated plasmas. *Physics of Plasmas*, 25(3):032704, 2018. doi:10.1063/1.5011818.
 ■ Citations WOS: 7 Scopus: 9
- [10] M. Holec, **J. Nikl**, M. Vranic and S. Weber. The effect of pre-plasma formation under nonlocal transport conditions for ultra-relativistic laser-plasma interaction. *Plasma Physics and Controlled Fusion*, 60(4):044019, 2018. doi:10.1088/1361-6587/aab05a.
 ■ Citations WOS: 6 Scopus: 9

Proceedings

- [1] M. Kucharik, **J. Nikl** and J. Limpouch. Second-order magnetic field generation model for Lagrangian and ALE plasma simulations. In *International Conference of Numerical Analysis and Applied Mathematics ICNAAM 2021*, AIP Conference Proceedings. 2021. Accepted.
- [2] **J. Nikl**, M. Kuchařík and S. Weber. Self-generated magnetic fields modelling within high-order Lagrangian magneto-hydrodynamics. In

Europhysics Conference Abstracts – 47th EPS Conference on Plasma Physics, page P1.2022. European Physical Society, 2021.

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- [3] M. Kucharik, J. Limpouch and **J. Nikl**. Development of ALE hydrodynamic code for laser-plasma interactions with self-generated magnetic fields. In *Europhysics Conference Abstracts – 47th EPS Conference on Plasma Physics*, page P1.2020. European Physical Society, 2021.

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- [4] M. Matys, M. Kecova, M. Kucharik, **J. Nikl**, S. V. Bulanov, M. Jirka, P. Janecka, J. Psikal, G. Korn, J. Grosz and O. Klimo. Laser-driven ion acceleration enhancement using silicon nitride plasma shutter. In *Europhysics Conference Abstracts – 47th EPS Conference on Plasma Physics*, page P3.2026. European Physical Society, 2021.

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- [5] **J. Nikl**, M. Jirka, M. Matys, M. Kuchařík and O. Klimo. Contrast enhancement of ultra-intense laser pulses by relativistic plasma shutter. In J. Hein, T. J. Butcher, P. Bakule, C. L. Haefner, G. Korn and L. O. Silva, editors, *High Power Lasers and Applications*, volume 11777 of *Proceedings of SPIE*, page 117770X. 2021. doi:10.1117/12.2589245.

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- [6] M. Matys, S. V. Bulanov, M. Kecova, M. Kucharik, M. Jirka, P. Janecka, J. Psikal, **J. Nikl**, J. Grosz, G. Korn and O. Klimo. Ion acceleration enhancement by laser-pulse shaping via plasma shutter. In S. S. Bulanov, J. Schreiber and C. B. Schroeder, editors, *Laser Acceleration of Electrons, Protons, and Ions VI*, volume 11779 of *Proceedings of SPIE*, page 117790Q. 2021. doi:10.1117/12.2589096.

■ Citations Scopus: 0

- [7] **J. Nikl**, M. Kuchařík and S. Weber. Lagrangian magneto-hydrodynamics based on curvilinear finite elements. In *14th WCCM-ECCOMAS Congress*. CIMNE, 2021. doi:10.23967/wccm-eccomas.2020.186.

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- [8] **J. Nikl**, M. Jirka, M. Kuchařík, M. Holec, M. Vranic and S. Weber. The effect of pre-plasma formed under the non-local transport conditions on the interaction of the ultra-high intensity laser with a solid target. In *Research using Extreme Light: Entering New Frontiers with Petawatt-Class Lasers IV*, volume 11039 of *Proceedings of SPIE*, page 110391E.

2019. doi:10.1117/12.2522450.

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- [9] **J. Nikl**, M. Kuchařík and S. Weber. Modelling of the non-local transport of energy in laser plasmas with high-order numerical methods. In *Europhysics Conference Abstracts – 46th EPS Conference on Plasma Physics*, volume 43C, page P5.2010. European Physical Society, 2019. ISBN 979-10-96389-11-7.

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- [10] M. Kuchařík, J. Limpouch, R. Liska and **J. Nikl**. Hydrodynamic simulations of laser/plasma interactions via ALE methods. In *Europhysics Conference Abstracts – 46th EPS Conference on Plasma Physics*, volume 43C, page P5.2009. European Physical Society, 2019. ISBN 979-10-96389-11-7.

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- [11] **J. Nikl**, M. Kuchařík, M. Holec and S. Weber. Curvilinear high-order Lagrangian hydrodynamic code for the laser-target interaction. In S. Coda, J. Berndt, G. Lapenta, M. Mantsinen, C. Michaut and S. Weber, editors, *Europhysics Conference Abstracts – 45th EPS Conference on Plasma Physics*, volume 42A, page P1.2019. European Physical Society, 2018. ISBN 979-10-96389-08-7.

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