Burning plasma achieved in inertial fusion

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#	Article	IF	Citations
1	Self-heating plasmas offer hope for energy from fusion. Nature, 2022, 601, 514-515.	13.7	2
2	Design of inertial fusion implosions reaching the burning plasma regime. Nature Physics, 2022, 18, 251-258.	6.5	87
3	Machine-learning guided optimization of laser pulses for direct-drive implosions. High Power Laser Science and Engineering, 2022, 10, .	2.0	15
4	Breakthrough at the NIF paves the way to inertial fusion energy. Europhysics News, 2022, 53, 18-23.	0.1	10
5	Experimental quantification of the impact of heterogeneous mix on thermonuclear burn. Physics of Plasmas, 2022, 29, .	0.7	7
6	Polychromatic drivers for inertial fusion energy. New Journal of Physics, 2022, 24, 043025.	1.2	5
7	Experimental Analysis of Ductile Cutting Regime in Face Milling of Sintered Silicon Carbide. Materials, 2022, 15, 2409.	1.3	2
8	A mechanism for reduced compression in indirectly driven layered capsule implosions. Physics of Plasmas, 2022, 29, .	0.7	18
9	Lawrence Livermore achieves a burning plasma in the lab. Physics Today, 2022, 75, 16-18.	0.3	4
10	Nonlinear gyrokinetic predictions of SPARC burning plasma profiles enabled by surrogate modeling. Nuclear Fusion, 2022, 62, 076036.	1.6	13
11	Simulation of the impact of using a novel neutron conversion screen on detector time characteristics and efficiency. AIP Advances, 2022, 12, 045206.	0.6	0
12	Ultra-Short-Pulse Lasersâ€"Materialsâ€"Applications. , 2021, 11, .		5
13	Applicability of semiclassical methods for modeling laser-enhanced fusion rates in a realistic setting. Physical Review C, 2022, 105, .	1.1	7
14	The Magnetized Indirect Drive Project on the National Ignition Facility. Journal of Fusion Energy, 2022, 41, 1.	0.5	14
15	Exploring implosion designs for increased compression on the National Ignition Facility using high density carbon ablators. Physics of Plasmas, 2022, 29, .	0.7	15
16	Effect of soft and hard x-rays on shock propagation, preheating, and ablation characteristics in pure and doped Be ablators. Physics of Plasmas, 2022, 29, .	0.7	3
17	Hydroscaling indirect-drive implosions on the National Ignition Facility. Physics of Plasmas, 2022, 29, .	0.7	4
18	Two plasmon decay instability stimulated by large-incidence-angle laser in inertial confinement fusion. Plasma Physics and Controlled Fusion, 0, , .	0.9	2

#	Article	IF	Citations
19	Neutron backscatter edges as a diagnostic of burn propagation. Physics of Plasmas, 2022, 29, 062707.	0.7	2
20	Intense Electromagnetic Pulses Generated From kJ-Laser Interacting With Hohlraum Targets. IEEE Transactions on Nuclear Science, 2022, 69, 2027-2036.	1.2	2
21	Progress toward fusion energy breakeven and gain as measured against the Lawson criterion. Physics of Plasmas, 2022, 29, .	0.7	39
22	Initiator enhancement of mandrel degradation for ICF target fabrication. IScience, 2022, , 104733.	1.9	0
23	Influence of uranium dioxide and reflector surface on neutron yields of the nuclear hybrid fusion-fission reaction using MCUNED code. Physica Scripta, 0, , .	1.2	0
24	Solutions of several theory and technique problems in high-space-resolving hotspot electron temperature diagnosis techniques in inertial confinement fusion. AIP Advances, 2022, 12, 075007.	0.6	0
25	Role of self-generated magnetic fields in the inertial fusion ignition threshold. Physics of Plasmas, 2022, 29, 072701.	0.7	2
26	Design optimization for Richtmyerâ€"Meshkov instability suppression at shock-compressed material interfaces. Physics of Fluids, 2022, 34, .	1.6	10
27	Self-generated magnetic field in ablative Rayleighâ€"Taylor instability. Physics of Plasmas, 2022, 29, .	0.7	3
28	High-resolution X-ray monochromatic imaging for laser plasma diagnostics based on toroidal crystal. Plasma Science and Technology, 0, , .	0.7	2
29	Three-dimensional electron temperature measurement of inertial confinement fusion hotspots using x-ray emission tomography. Review of Scientific Instruments, 2022, 93, .	0.6	5
30	Knock-on deuteron imaging for diagnosing the morphology of an ICF implosion at OMEGA. Physics of Plasmas, 2022, 29, .	0.7	4
31	The commercialisation of fusion for the energy market: a review of socio-economic studies. Progress in Energy, 2022, 4, 042008.	4.6	8
32	Design of an inertial fusion experiment exceeding the Lawson criterion for ignition. Physical Review E, 2022, 106, .	0.8	75
33	Stress and wavefront measurement of large-aperture optical components with a ptychographical iterative engine. Applied Optics, 2022, 61, 7231.	0.9	1
34	Interstellar Propulsion Using Laser-Driven Inertial Confinement Fusion Physics. Universe, 2022, 8, 421.	0.9	7
35	Fusion Turns Up the Heat. Physics Magazine, 0, 15, .	0.1	2
36	Platform for probing radiation transport properties of hydrogen at conditions found in the deep interiors of red dwarfs. Physics of Plasmas, 2022, 29, .	0.7	5

#	Article	IF	Citations
37	Performance of a hardened x-ray streak camera at Lawrence Livermore National Laboratoryâ€™s National Ignition Facility. Review of Scientific Instruments, 2022, 93, 083519.	0.6	4
38	High-yield magnetic recoil neutron spectrometer on the National Ignition Facility for operation up to 60 MJ. Review of Scientific Instruments, 2022, 93, 083513.	0.6	1
39	Experimental achievement and signatures of ignition at the National Ignition Facility. Physical Review E, 2022, 106, .	0.8	83
40	Lawson Criterion for Ignition Exceeded in an Inertial Fusion Experiment. Physical Review Letters, 2022, 129, .	2.9	163
41	Mitigation of the ablative Rayleighâ€“Taylor instability by nonlocal electron heat transport. Matter and Radiation at Extremes, 2022, 7, .	1.5	11
42	Diffraction enhanced imaging utilizing a laser produced x-ray source. Review of Scientific Instruments, 2022, 93, .	0.6	4
43	Specular reflections (â€œglintâ€) of the inner beams in a gas-filled cylindrical hohlraum. Physics of Plasmas, 2022, 29, .	0.7	4
44	Design of multi neutron-to-gamma converter array for measuring time resolved ion temperature of inertial confinement fusion implosions. Review of Scientific Instruments, 2022, 93, .	0.6	4
45	Benchmarking solid-to-plasma transition modeling for inertial confinement fusion laser-imprint with a pump-probe experiment. Physical Review Research, 2022, 4, .	1.3	0
46	Design of laser pulse shapes and target structures by random optimization for direct-drive inertial confinement fusion. Physics of Plasmas, 2022, 29, .	0.7	4
47	Effect of nuclear charge on laser-induced fusion enhancement in advanced fusion fuels. Physical Review C, 2022, 106, .	1.1	0
48	Cylindrical implosion platform for the study of highly magnetized plasmas at Laser MegaJoule. Physical Review E, 2022, 106, .	0.8	5
49	Chapmanâ€“Enskog derivation of multicomponent Navierâ€“Stokes equations. Physics of Plasmas, 2022, 29, 090901.	0.7	2
50	Three-dimensional hot-spot x-ray emission tomography from cryogenic deuteriumâ€“tritium direct-drive implosions on OMEGA. Review of Scientific Instruments, 2022, 93, .	0.6	6
51	Dream fusion in octahedral spherical hohlraum. Matter and Radiation at Extremes, 2022, 7, .	1.5	17
52	Novel fabrication tools for dynamic compression targets with engineered voids using photolithography methods. Review of Scientific Instruments, 2022, 93, .	0.6	4
53	Equation of state of tungsten-doped carbon based on QEOS model for laser fusion. AIP Advances, 2022, 12, 105204.	0.6	0
54	Multilayer coating design methods for a high-energy x-ray imaging optic with complex design requirements. , 2022, , .		0

#	Article	IF	Citations
55	Lasers for the observation of multiple order nuclear reactions. Frontiers in Physics, 0, 10, .	1.0	0
56	Current challenges in the physics of white dwarf stars. Physics Reports, 2022, 988, 1-63.	10.3	29
57	Comment on â€˜The advanced tokamak path to a compact net electric fusion pilot plantâ€™. Nuclear Fusion, 2022, 62, 128001.	1.6	0
58	Gas scintillation mitigation in gas Cherenkov detectors for inertial confinement fusion (invited). Review of Scientific Instruments, 2022, 93, .	0.6	2
59	Emission of whistler mode radiation with kinetic Alfven wave in burning plasma. European Physical Journal Plus, 2022, 137, .	1.2	1
60	Optimization of Backscatter and Symmetry for Laser Fusion Experiments Using Multiple Tunable Wavelengths. Physical Review Applied, 2022, 18, .	1.5	2
61	SCHOTT laser glass [Invited]. Optical Materials Express, 2022, 12, 4399.	1.6	6
62	Non-linear stimulated Raman back-scattering burst driven by a broadband laser. Physics of Plasmas, 2022, 29, .	0.7	6
63	Determination of laser entrance hole size for ignition-scale octahedral spherical hohlraums. Matter and Radiation at Extremes, 2022, 7, .	1.5	10
64	The Richtmyerâ€“Meshkov instability of thermal, isotope and species interfaces in a five-moment multi-fluid plasma. Journal of Fluid Mechanics, 2022, 951, .	1.4	3
65	Multicomponent mutual diffusion in the warm, dense matter regime. Physics of Plasmas, 2022, 29, 112703.	0.7	0
66	Development of the HeliosX mission analysis code for advanced ICF space propulsion. Acta Astronautica, 2023, 202, 157-173.	1.7	2
67	X-ray-imaging spectrometer (XRIS) for studies of residual kinetic energy and low-mode asymmetries in inertial confinement fusion implosions at OMEGA (invited). Review of Scientific Instruments, 2022, 93, 113540.	0.6	2
68	Design of a multi-detector, single line-of-sight, time-of-flight system to measure time-resolved neutron energy spectra. Review of Scientific Instruments, 2022, 93, 113528.	0.6	1
69	Burning plasma surprise. Nature Physics, 0, , .	6.5	0
70	Increased Ion Temperature and Neutron Yield Observed in Magnetized Indirectly Driven <mml:math xmlns:mml="http://www.w3.org/1998/Math/MathML" display="inline"><mml:mrow><mml:msub><mml:mrow><mml:mi mathvariant="normal">D</mml:mi></mml:mrow><mml:mrow><mml:mn>2</mml:mn></mml:mrow></mml:msub></mml:mrow></mm -Filled Capsule Implosions on the National Ignition Facility. Physical Review Letters, 2022, 129, .	2.9	18
71	1â€‰GW peak power and 100â€‰J pulsed operation of a diode-pumped Tm:YLF laser. Optics Express, 2022, 30, 46336.	1.7	7
72	Commissioning results from the high-repetition rate nanosecond-kilojoule laser beamline at the extreme light infrastructure. Plasma Physics and Controlled Fusion, 2023, 65, 015004.	0.9	4

#	Article	IF	Citations
73	Modeling ablator grain structure impacts in ICF implosions. Physics of Plasmas, 2022, 29, .	0.7	9
74	Evidence for suprathermal ion distribution in burning plasmas. Nature Physics, 2023, 19, 72-77.	6.5	13
75	Direct Measurement of Ice-Ablator Interface Motion for Instability Mitigation in Indirect Drive ICF Implosions. Physical Review Letters, 2022, 129, .	2.9	4
76	Fusion: a true challenge for an enormous reward. EPJ Web of Conferences, 2022, 268, 00011.	0.1	0
77	Effect of isostructural phase transition on cycling stability of ZrCo-based alloys for hydrogen isotopes storage. Chemical Engineering Journal, 2023, 455, 140571.	6.6	7
78	Electronic pair alignment and roton feature in the warm dense electron gas. Communications Physics, 2022, 5, .	2.0	20
79	TOF Analysis of Ions Accelerated at High Repetition Rate from Laser-Induced Plasma. Applied Sciences (Switzerland), 2022, 12, 13021.	1.3	1
80	A milestone in fusion research is reached. Nature Reviews Physics, 2023, 5, 6-8.	11.9	13
81	A 2D dynamic model for the impact of time-dependent low-mode drive asymmetries on the shell asymmetries during acceleration phases of ICF implosions. Plasma Physics and Controlled Fusion, 0, , .	0.9	0
82	Path to Increasing p-B11 Reactivity via ps and ns Lasers. Laser and Particle Beams, 2022, 2022, .	0.4	8
83	Tungsten doped diamond shells for record neutron yield inertial confinement fusion experiments at the National Ignition Facility. Nuclear Fusion, 2023, 63, 016022.	1.6	7
84	Accurate temperature diagnostics for matter under extreme conditions. Nature Communications, 2022, 13, .	5.8	27
85	Sunvoyager: Interstellar Precursor Probe Mission Concept Driven by Inertial Confinement Fusion Propulsion. Journal of Spacecraft and Rockets, 2023, 60, 797-811.	1.3	2
86	Impact of hohlraum cooling on ignition metrics for inertial fusion implosions. Physics of Plasmas, 2023, 30, .	0.7	5
87	Influence of mass ablation on ignition and burn propagation in layered fusion capsules. Physics of Plasmas, 2023, 30, .	0.7	5
88	Imaging velocity interferometer system for any reflector (VISAR) diagnostics for high energy density sciences. Review of Scientific Instruments, 2023, 94, .	0.6	9
89	The importance of laser wavelength for driving inertial confinement fusion targets. II. Target design. Physics of Plasmas, 2023, 30, .	0.7	7
90	Measurement of Dark Ice-Ablator Mix in Inertial Confinement Fusion. Physical Review Letters, 2022, 129, .	2.9	10

#	Article	IF	Citations
91	Physical design for driven device of Z-FFR based on Machine Learning. , 2022, , .		1
92	Developing a platform for Fresnel diffractive radiography with 1 <i>Î¼</i>m spatial resolution at the National Ignition Facility. Review of Scientific Instruments, 2023, 94, .	0.6	2
93	Physical design of fusion based on generative adversarial networks. , 2022, , .		0
94	è„‰å†²å¤åŠæŠ€æœ¯æå‡è„‰å†²å±•å®½å ˆ†å¹…ç›¸æœºæ—¶é—´åˆ†è¾¨èƒ½åŠ›. Guangxue Xuebao/Acta Optica Sinica, 2023, 43, 0532001.	0.2	0
95	Simulation and assessment of material mixing in an indirect-drive implosion with a hybrid fluid-PIC code. Frontiers in Physics, 0, 11, .	1.0	2
96	Fabrication of nanocrystalline diamond capsules by hot-filament chemical vapor deposition for direct-drive inertial confinement fusion experiments. Diamond and Related Materials, 2023, 135, 109896.	1.8	1
97	Evolution of induction synchrotrons. Reviews in Physics, 2023, 10, 100083.	4.4	2
98	Physical Design of Local-volume Ignition for Inertial Confinement Fusion. , 2022, , .		1
99	Toward more robust ignition of inertial fusion targets. Physics of Plasmas, 2023, 30, .	0.7	2
100	Neutron imaging of inertial confinement fusion implosions. Review of Scientific Instruments, 2023, 94, .	0.6	6
101	Generation, measurement, and modeling of strong magnetic fields generated by laser-driven micro coils. Reviews of Modern Plasma Physics, 2023, 7, .	2.2	4
102	Determining the driving radiation flux on capsule in <i>Hohlraum</i> for indirect drive inertial confinement fusion. Physics of Plasmas, 2023, 30, 022705.	0.7	1
103	The effect of collisions on the multi-fluid plasma Richtmyerâ€“Meshkov instability. Physics of Plasmas, 2023, 30, .	0.7	1
104	Tango Controls and data pipeline for petawatt laser experiments. High Power Laser Science and Engineering, 2023, 11, .	2.0	2
105	Thermodynamics of diamond formation from hydrocarbon mixtures in planets. Nature Communications, 2023, 14, .	5.8	12
106	Dynamical thermal noise effects on the p11B fusion plasma utilizing KrF laser. Indian Journal of Physics, 0, , .	0.9	0
107	Soft x-ray power diagnostics for fusion experiments at NIF, Omega, and Z facilities. Review of Scientific Instruments, 2023, 94, .	0.6	6
108	Physical design of fusion target with edge computing. Journal of Physics: Conference Series, 2023, 2450, 012073.	0.3	0

#	Article	IF	Citations
109	High energy operation of a diode-pumped Tm:YLF laser. , 2023, , .		0
110	Electronic density response of warm dense matter. Physics of Plasmas, 2023, 30, .	0.7	23
111	⁴⁰Ar proposed as probe of neutron-induced reactions in a high-density stellar-like plasma at the National Ignition Facility. EPJ Web of Conferences, 2023, 279, 13004.	0.1	0
112	Influence of a random phase plate on the growth of the backward stimulated Brillouin scatter. Physical Review E, 2023, 107, .	0.8	2
113	The nonlocal electron heat transport under the non-Maxwellian distribution in laser plasmas and its influence on laser ablation. Physics of Plasmas, 2023, 30, .	0.7	2
114	Breakup-based preparation of ultra-thin solid-in-water-in-oil conformal droplets in a microchannel. Physics of Fluids, 2023, 35, 043323.	1.6	2
115	Laser repointing scheme for octahedral spherical <i>hohlraum</i>s on the SGIII laser facility. Physics of Plasmas, 2023, 30, 042703.	0.7	1
116	åŸºäºŽè„‰å†²é™¡åŒ–æŠ€æœ¯çš„çš®ç§’å˜†å¹…ç›¸æœºé€‰é€šè„‰å†²ç”¨©¶. Guangzi Xuebao/Acta Photonica Sinica, 2023, 52, 01	0.1	0
117	Imaginary-time correlation function thermometry: A new, high-accuracy and model-free temperature analysis technique for x-ray Thomson scattering data. Physics of Plasmas, 2023, 30, .	0.7	7
118	On characterization of shock propagation and radiative preheating in x-ray driven high-density carbon foils. Physics of Plasmas, 2023, 30, .	0.7	1
119	Investigating boosted decision trees as a guide for inertial confinement fusion design. Physics of Plasmas, 2023, 30, 042713.	0.7	0
120	Big data collaborative artificial intelligence and high-performance computing to drive physical design of fusion. , 2022, , .		5
140	HB11â€"Understanding Hydrogen-Boron Fusion as a New Clean Energy Source. Journal of Fusion Energy, 2023, 42, .	0.5	3
158	Advances in laser-driven neutron sources and applications. European Physical Journal A, 2023, 59, .	1.0	0
166	The new approach to writing source code for high-performance computing of Z-FFR models based on artificial intelligence and big data. , 2023, , .		0
170	Artificial intelligence-assisted physical design of fusion materials. , 2023, , .		0
189	Spectral width calibration technology of frequency modulated laser pulse using morphology matching. , 2023, , .		0
191	Multimodal Imaging and Tomography. , 2023, , .		0

#	Article	IF	Citations
206	Universal strategies for enhancing the laser energy loading capability of pulse compression gratings. , 2023, , .		0