

topic	#	title	Major Opp. #
Reconnection	1.1	Reconnection and particle acceleration	1
	1.2	Reconnection under extreme conditions	9
	1.3	Reconnection explosive onset	1
Shock	2.1	Cosmic ray acceleration	2
	2.2	Shock in lab	2
	2.3	Connection between astrophysical and heliospheric shocks	2
Turbulence	3.1	Turbulent particle heating	2
	3.2	Experimental initiatives on turbulence	3
Dynamo	4.1	Generation of large-scale, possibly cyclic, magnetic field	4,1
	4.2	Field generation in systems dominated by non-MHD effects	3
Shear	5.1	Magnetic field observations and HED experiment with advanced diagnostics	6,7,8
	5.2	Radiation-dominated experiments on NIF	5
	5.3	Coordinated missions to study shear instability between solar wind and Earth's magnetic field	3
	5.4	Study jet stability using HED and non-HED experiments	8,3
	5.5	HED experiments on reconnection in collisional and high-beta plasmas	9
	5.6	Exaflop-scale computing on turbulent mixing and stellar death	7
Momentum	6.1	Develop scalings using simulation and experiments for disks and stars	5,6,4,3
	6.2	Stellar momentum transport understanding based on new satellite data, convective simulations and laboratory experiments	4
	6.3	New plasma observations near our Galactic black hole horizon	5,3
Dusty	7.1	Understand dust charging by theory and experiments in lab, near-earth, lunar, and space	6
	7.2	Understand dust growth and breakup by a new space mission, supplemented by dedicated lab experiments	6
	7.3	Magnetic couplings to dusts via a new dedicated experiment	6
Radiative Hydro	8.1	Radiative transfer in HD and MHD for star formation via new algorithms and computing power, benchmarked by HED experiments	6
	8.2	Improved understanding via new algorithms or experiments on neutrino transport, radiative heat transport, and radiative shock during supernova	7
	8.3	Laboratory tests of radiation-dominated models for luminous black hole accretion	5
	8.4	Intensive radiation and stellar wind on exoplanet atmosphere	6
Relativistic	9.1	Computational and laboratory opportunities in relativistic beam dissipation and collisionless shocks	2,3
	9.2	Reconnection and turbulence cascade: computation and laser experiments	3,9
	9.3	Relativistic jet study via magnetized HED experiments and computation	8
	9.4	Strongly-magnetized, pair plasma study via laser experiments	9
Jets	10.1	Establish an interdisciplinary consortium to coordinate studies of astrophysical jets	8,3
	10.2	Observational opportunities for jet-launching area and jet propagation area	8
	10.3	Jet stability study via combinations of observation, experiment and simulation	8,3