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A Spherical Laser System For Inertial Confinement Fusion[1]
CATALIN FILIP, Department of Physics, University of Nevada, Reno, Nevada, PATRIC MUGGLI, Electrical Engineering & Electrophysics Department, University of Southern California, Los Angeles, California — The possibility to ignite nuclear fusion through implosion of a spherical pellet within a spherical laser cavity is examined theoretically. The resonator is formed by the pellet (and later the pellet plasma) and a spherical mirror (M). The gain medium is a spherical shell placed on the inside of this mirror. The medium is optically pumped from the outside on a nanosecond time-scale with pump beams that are uniformly distributed across mirror M. This mirror is a dichroic designed to transmit the pump pulses and trap the radially-propagating laser radiation within the resonator. In this system, as opposed to the direct drive scheme, the illumination uniformity of the pellet is determined by the resonator itself (not by the distribution of the laser beams), and the laser energy reflected by the plasma (that is normally lost) is recirculated and amplified to intensities $> 10^{15} W/cm^2$, sufficient for ablation- driven compression of the fuel pellet to ignition conditions.

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