## **Preliminary Research of Laser-Beam Interaction in Dielectric Structure**

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The acceleration gradient of traditional accelerator has met the threshold due to the RF breakdown effect. Then the concept of **DLA (dielectric laser accelerator)** was proposed. As a kind of DLA structure, dual-pillar structure was studied in the field of theory, simulation and experiment.

Based on CST with PIC simulation in different modes, the results of the distribution of EM field, damage threshold assessment and size of beam bunch are simulated.

For dual-drive acceleration mode, the effect of different input phase of bunch on 3D bunch size is discussed. The highest acceleration gradient is ~300MeV/m, and the maximum energy gain in 9.6µm structure is 3.3keV. For deflection mode, the effect from EM field and self-interaction force on the transverse velocity is discussed with the variation of the transverse size of the beam observed in simulation.

For single-drive acceleration mode, the effect of distribution Bragg reflector on the energy gain of beam and acceleration gradient is discussed based on the comparison of different drive modes.







 $E_z^{(n)} = iE_0(-d_n e^{-\Gamma_n y} + c_n e^{\Gamma_n y})e^{i(k_n + k_z)z}$ 

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