**Particle acceleration in relativistic collisionless shocks: emergence of Fermi acceleration and energy bifurcation** ROOPENDRA SINGH RAJAWAT, Cornell University, VLADIMIR KHUDIK, University of Texas, GENNADY SHVETS, Cornell University — A numerical study of Weibel-mediated collisionless shocks has been carried out by means of multidimensional first-principle particle-in-cell simulation code. In the simulations, the collisionless shock is generated via collision of two relativistic electron-positron plasma shells having initial kinetic energies $\gamma_0 mc^2$. In the downstream region of the shock, we have identified two group of particles: having moderate $\gamma \sim \gamma_0$ and large kinetic energies $\gamma >> \gamma_0$. To get insight of the acceleration/deceleration mechanism, kinetic energy (KE) of the particles in these groups has been decomposed into the works done by the transverse and longitudinal electric fields. It is found that in the first group the KE takes equal contribution from both components of the electric field, while in the second group the KE takes most of the energy from the transverse electric field: the ratio of work done by the transverse and longitudinal electric field is found out to be dependent on the time. The position of the separation point between these two groups remains constant with time and is found to be $\gamma/\gamma_0 \sim 2$. The study has been extended for the perpendicular magnetized relativistic collisionless shocks.

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