In previous researches, shocks are considered as one-dimensional or quasi-one-dimensional. Namely either periodic boundaries or very large laser focal spots are employed. However, these one-dimensional approximations are hard to reach in experiments since high laser intensity as well as long-distance shock propagation are both required.

As we show in this paper, finite laser focal size has important impact on the shock ion acceleration scheme.

When laser focal size is less then shock propagation distance, transverse effects must be considered. By two-dimensional PIC simulation, we study several effects that could undermine the scheme of shock acceleration. On the other hand, we propose the confined-configuration to mitigate the transverse effects. And the advantages of the confined- over open-configuration will also be discussed.

Then, a new easy method of controlling plasma density profile is displayed by the PIC simulation.