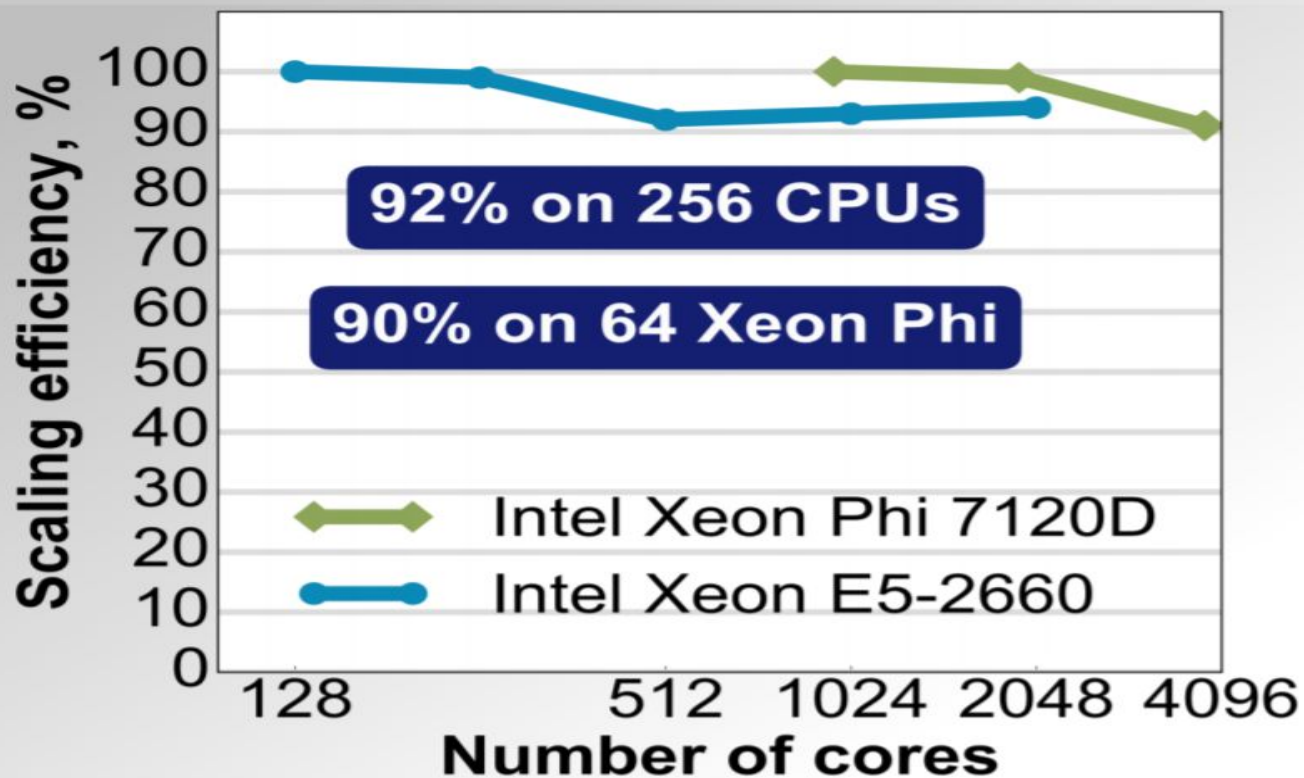


# Обзор доклада о высокопроизводительной реализации метода частиц в ячейках в коде PICADOR для численного моделирования лазерной плазмы

выполнил Шумаев А.А.  
на основе выступления Меерова И.Б.

# Scaling on Distributed Memory



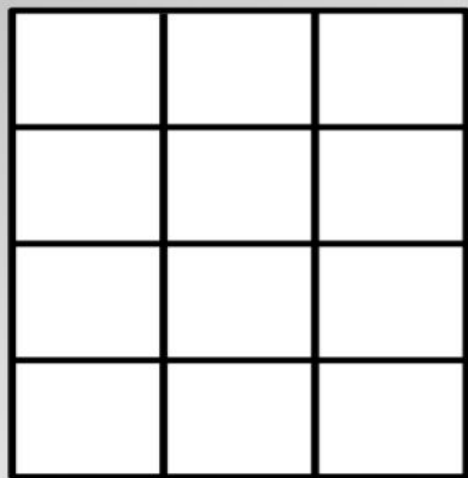
Problem: laser wakefield acceleration

Parameters: 512×512×512 grid, 1015 mln. particles, TSC form factor

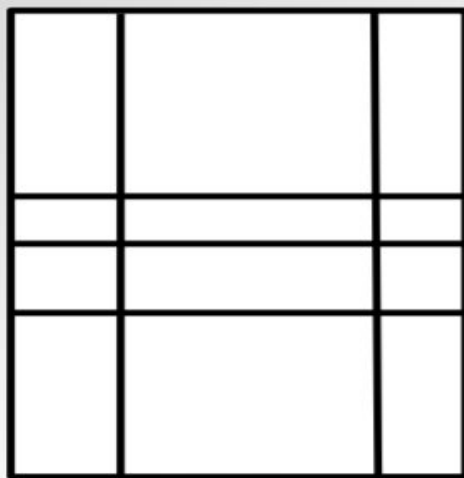
# Rectilinear Partitioning

- Topologically equivalent to spatially uniform:
  - Each subdomain is axis-aligned box
  - Each subdomain has 26 neighbours

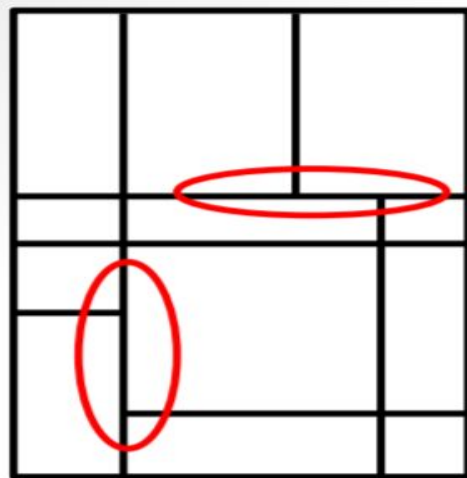
Spatially uniform

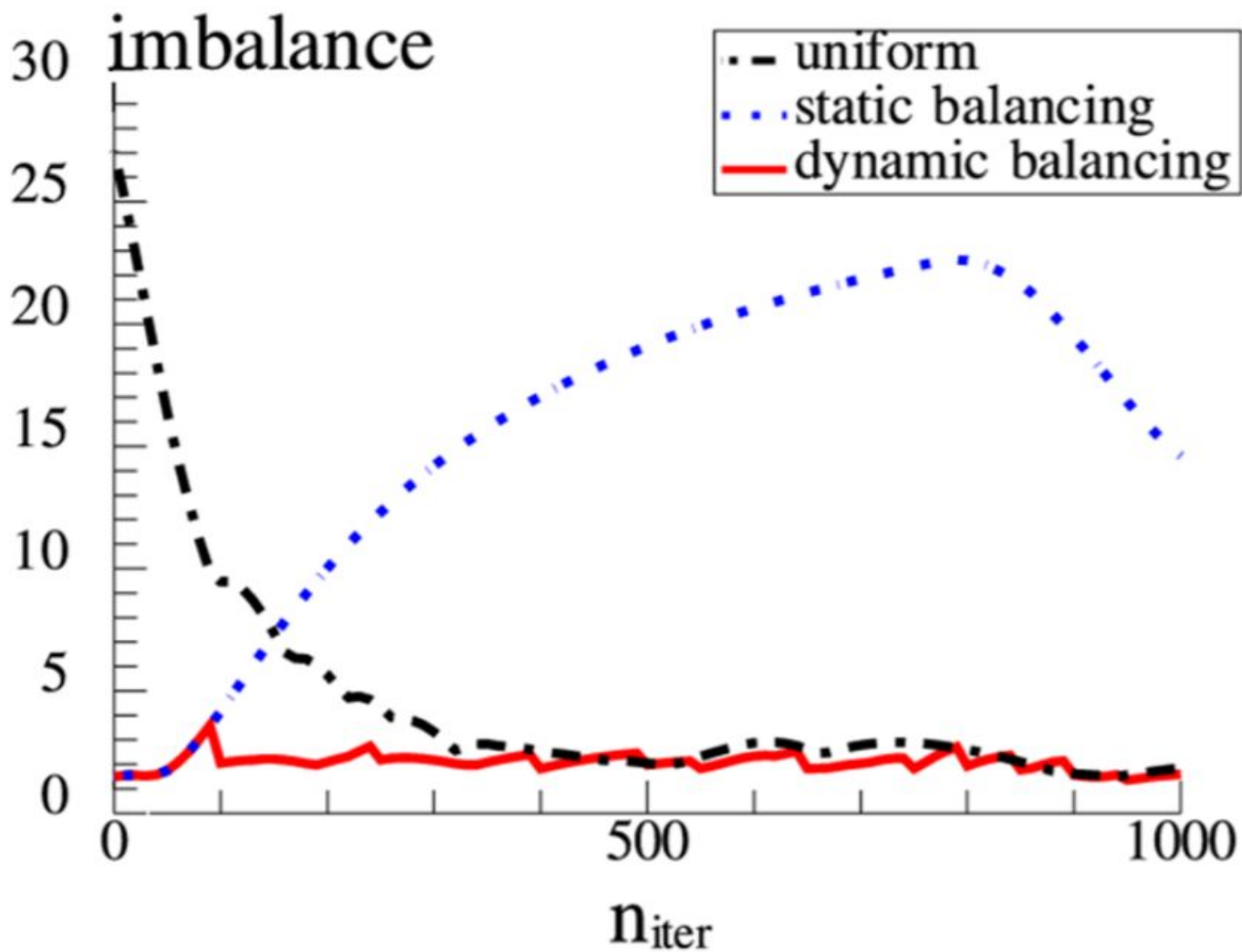


Rectilinear

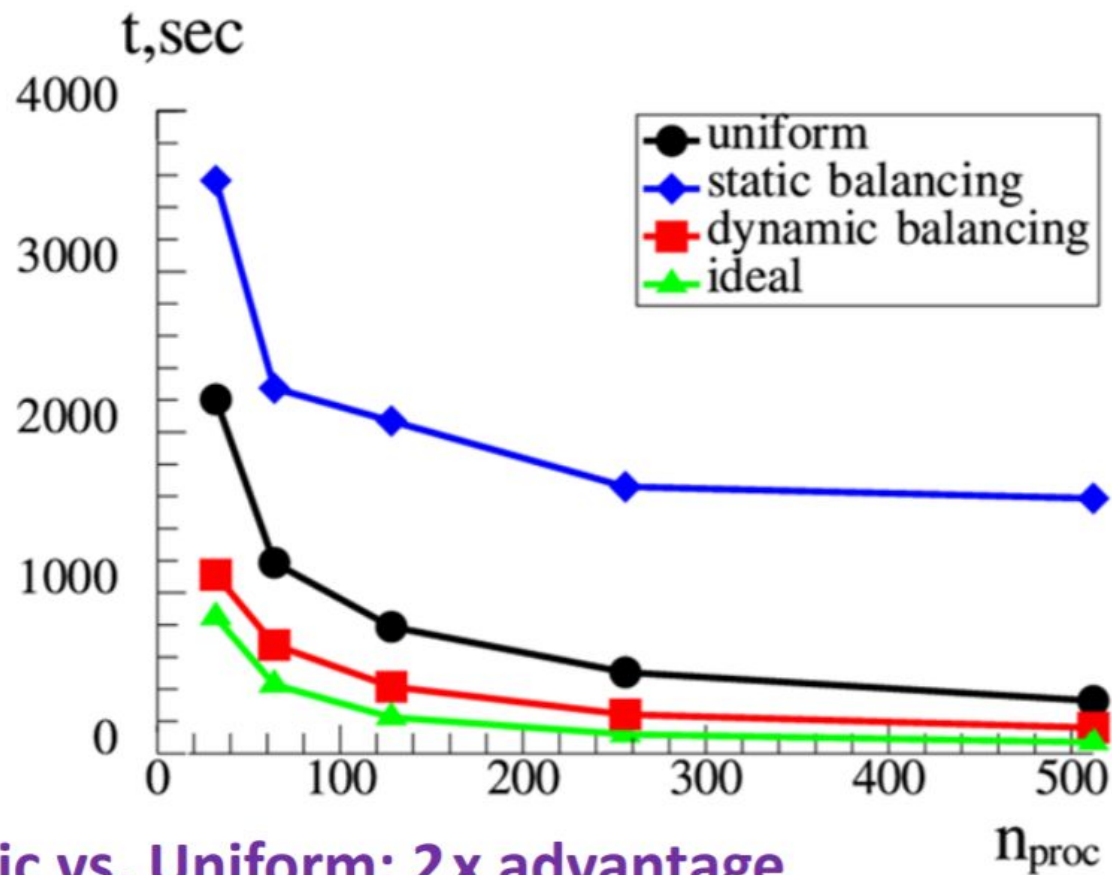


Not rectilinear



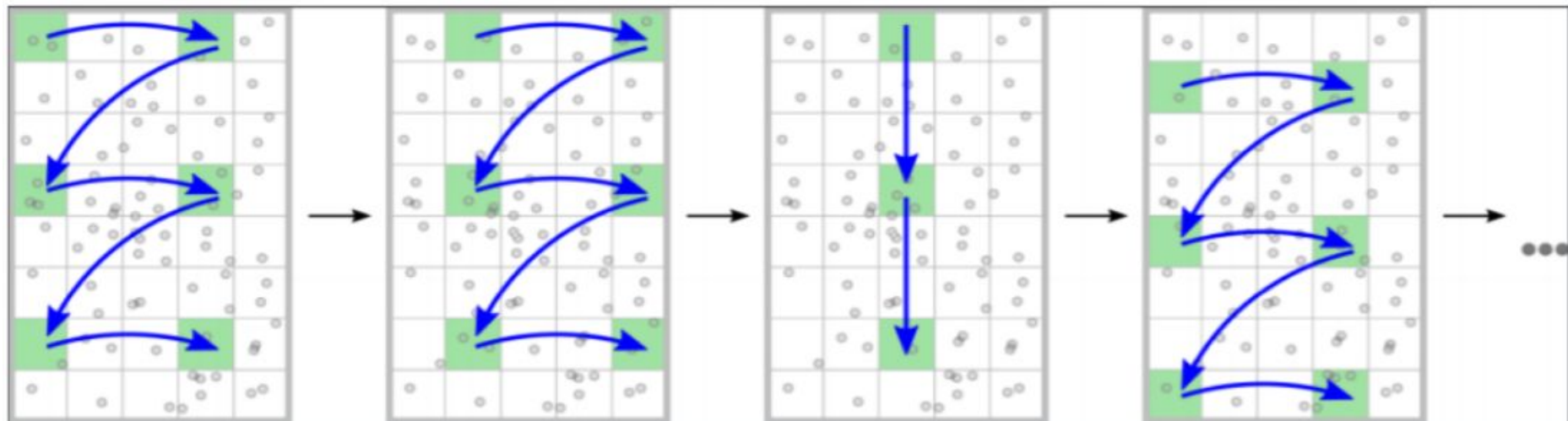


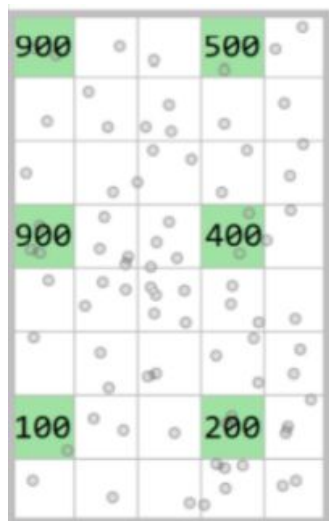
# Ideal – simulation of the same size with ideal balancing



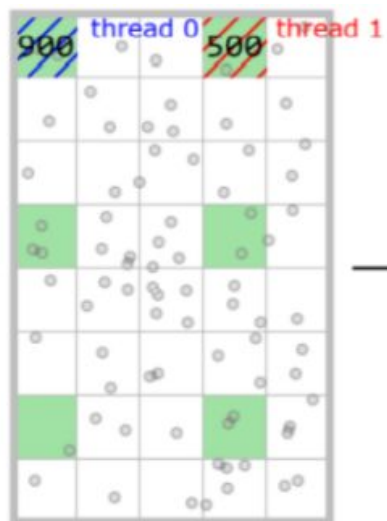
**Dynamic vs. Uniform: 2x advantage**

**Dynamic vs. Ideal: 1.5x disadvantage**

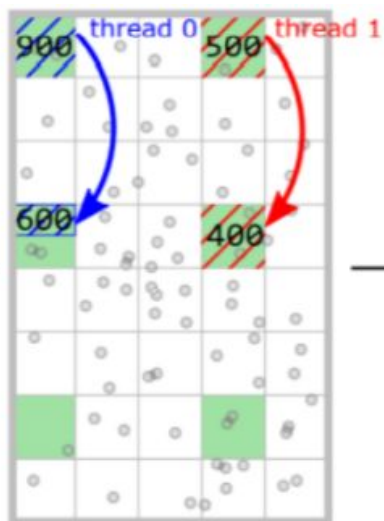




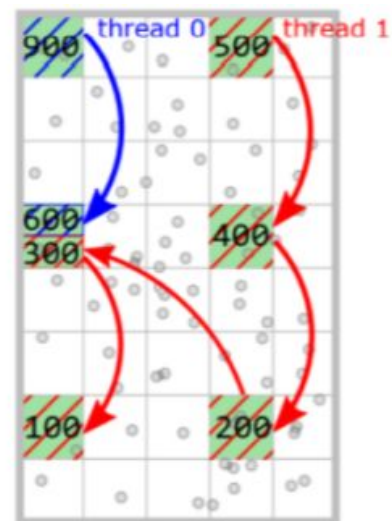
step 0  
 thread 0 - 0 particles  
 thread 1 - 0 particles



step 1  
 thread 0 - 900 particles  
 thread 1 - 500 particles



step 2  
 thread 0 - 1500 particles  
 thread 1 - 900 particles



step 5  
 thread 0 - 1500 particles  
 thread 1 - 1500 particles

Variance:

$\sigma_1^2$  - - ● - -

$\sigma_2^2$  - - ■ - -

$\sigma_3^2$  ··· ▲ ···

Scheme:

Static ■

ManDist ■

PartDist ■

