

# COSMOGRID

Cees de Laat

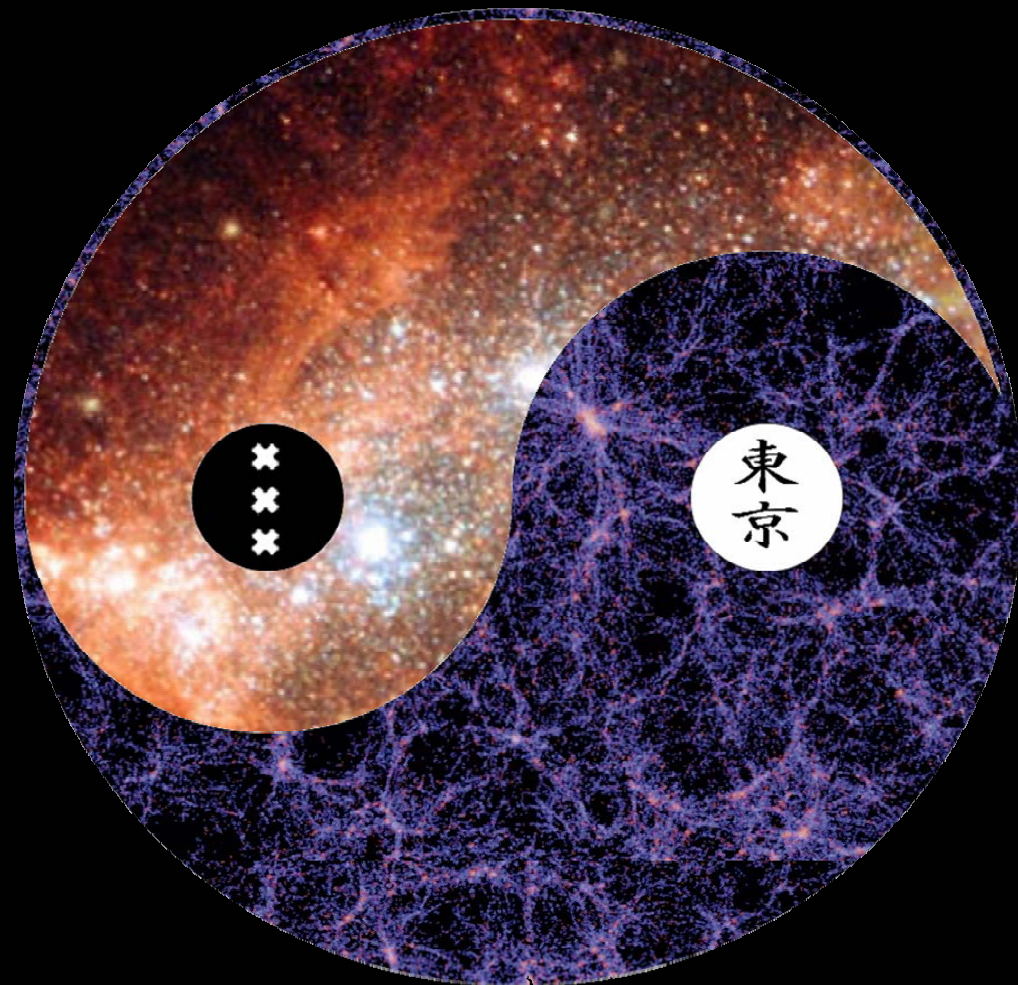
University of Amsterdam



# CosmoGrid

Details at: <http://wiki.2048x2048x2048.org>

- A cosmological N-body simulation with 10 billion particles
- Higher resolution, higher accuracy and better performance

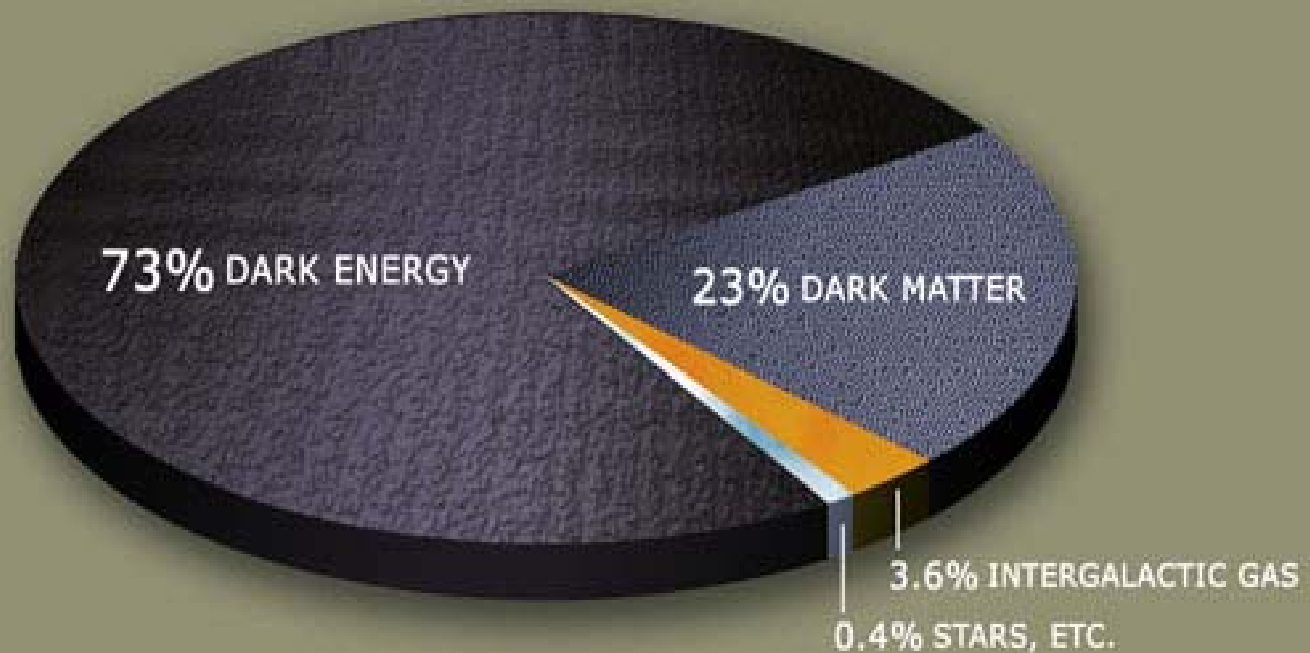


# CosmoGrid:

A large scale cosmological simulation of a limited volume



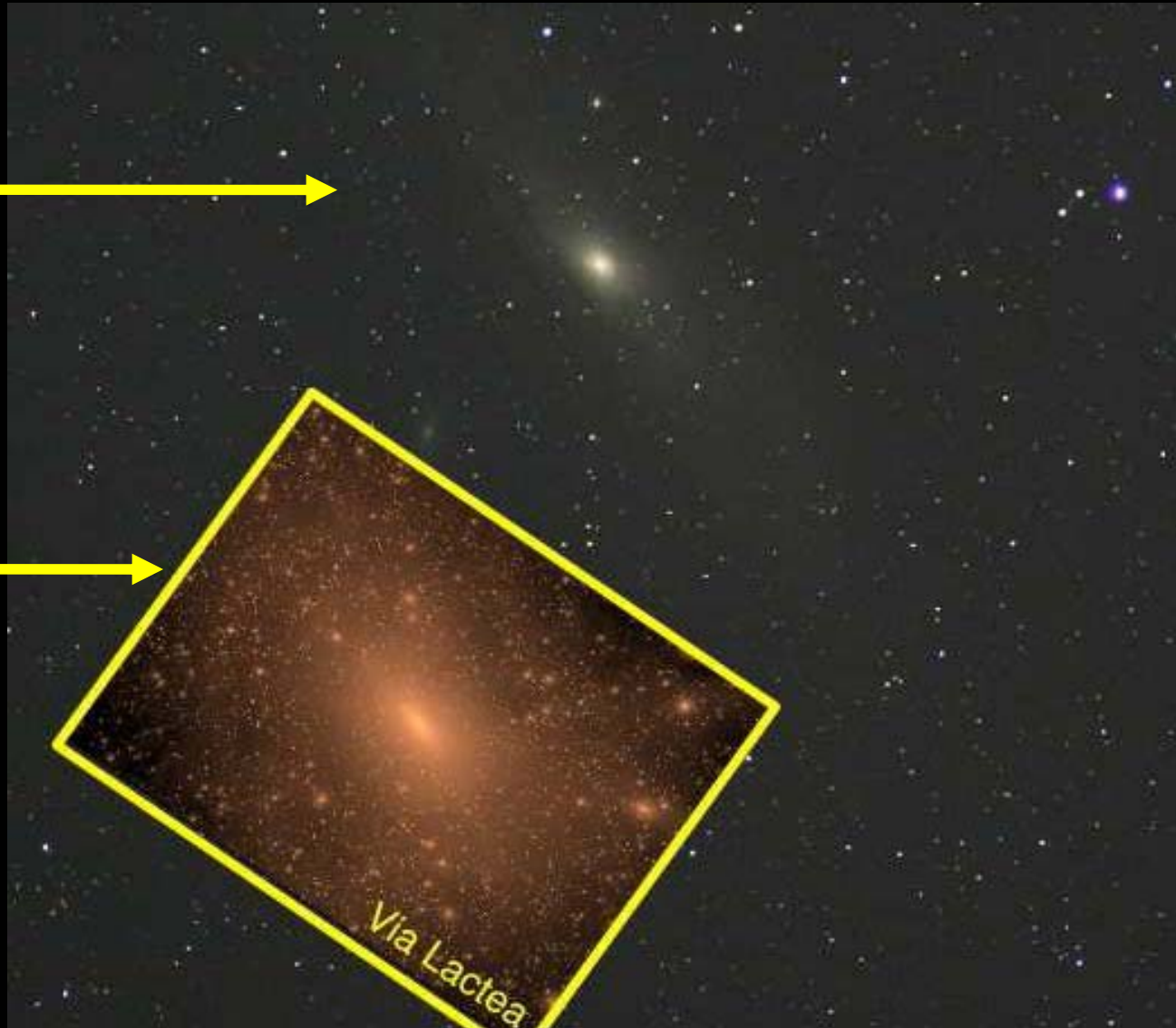
# Composition of the Universe



# The CosmoGrid project

- Motivation: **previous simulations found >100 times more substructure than is observed**
- Simulate large structure formation in the Universe
  - Dark Energy (cosmological constant)
  - Dark Matter (particles)
- Method: Cosmological  $N$ -body code
- Computer: Intercontinental supercomputer grid

# Too much substructure in simulations



# The hardware setup

- 2 supercomputers :
  - 1 in Amsterdam (60Tflops Power6 @ SARA)
  - 1 in Tokyo (30Tflops Cray XD0-4 @ CFCA)
- Both computers are connected via an intercontinental optical 10Gbit/s network



10 Gb/s dedicated network



# Z=0 result of test calculation ( $N=128^3$ )



30Mpc on the side  
32nodes Amsterdam  
32nodes Tokyo  
Regular network

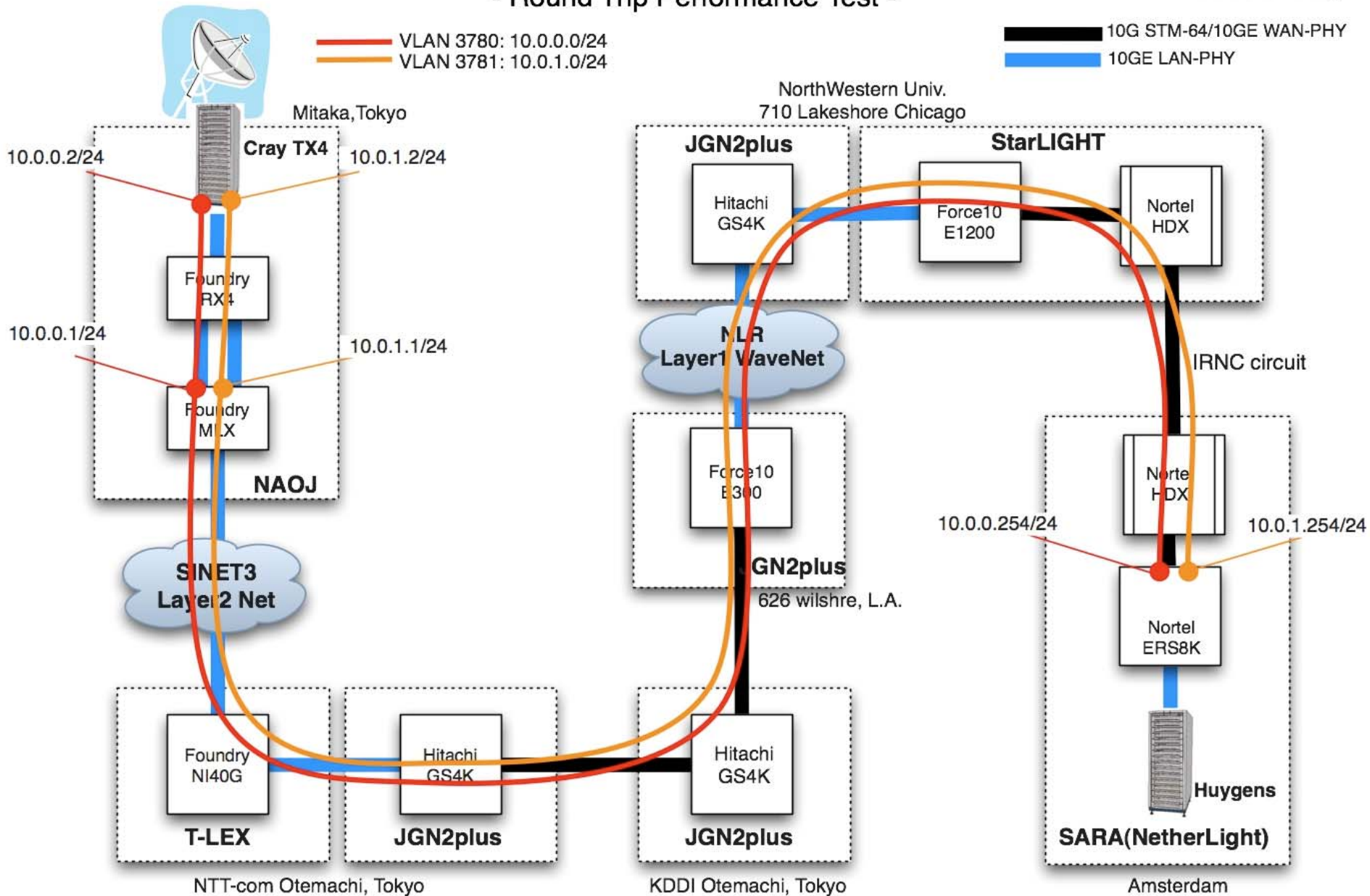


# CosmoGrid network

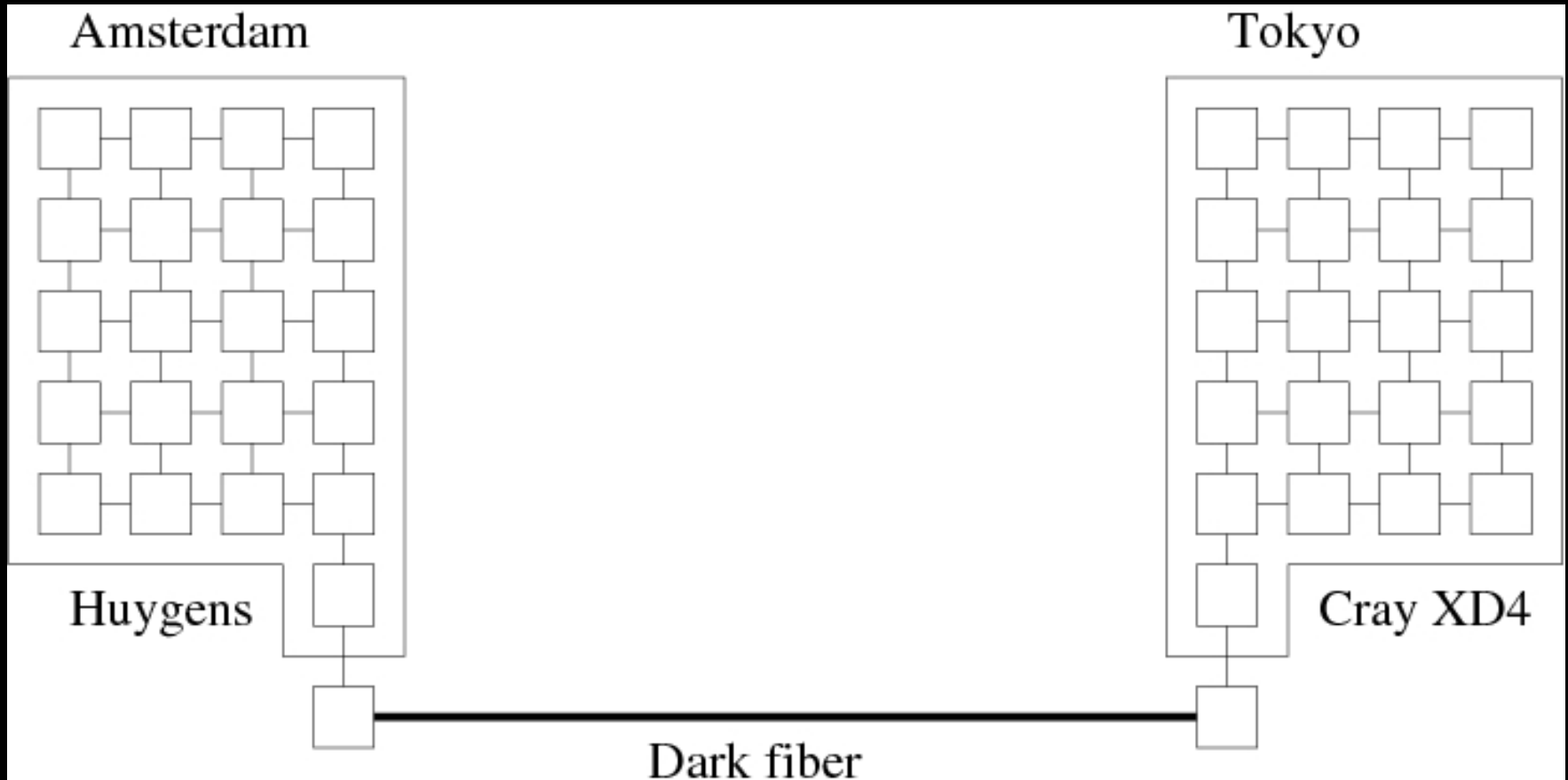
## Network Topology for Cosmo Grid experiment - Round Trip Performance Test -

Rev0 · 4 May. 21 2008

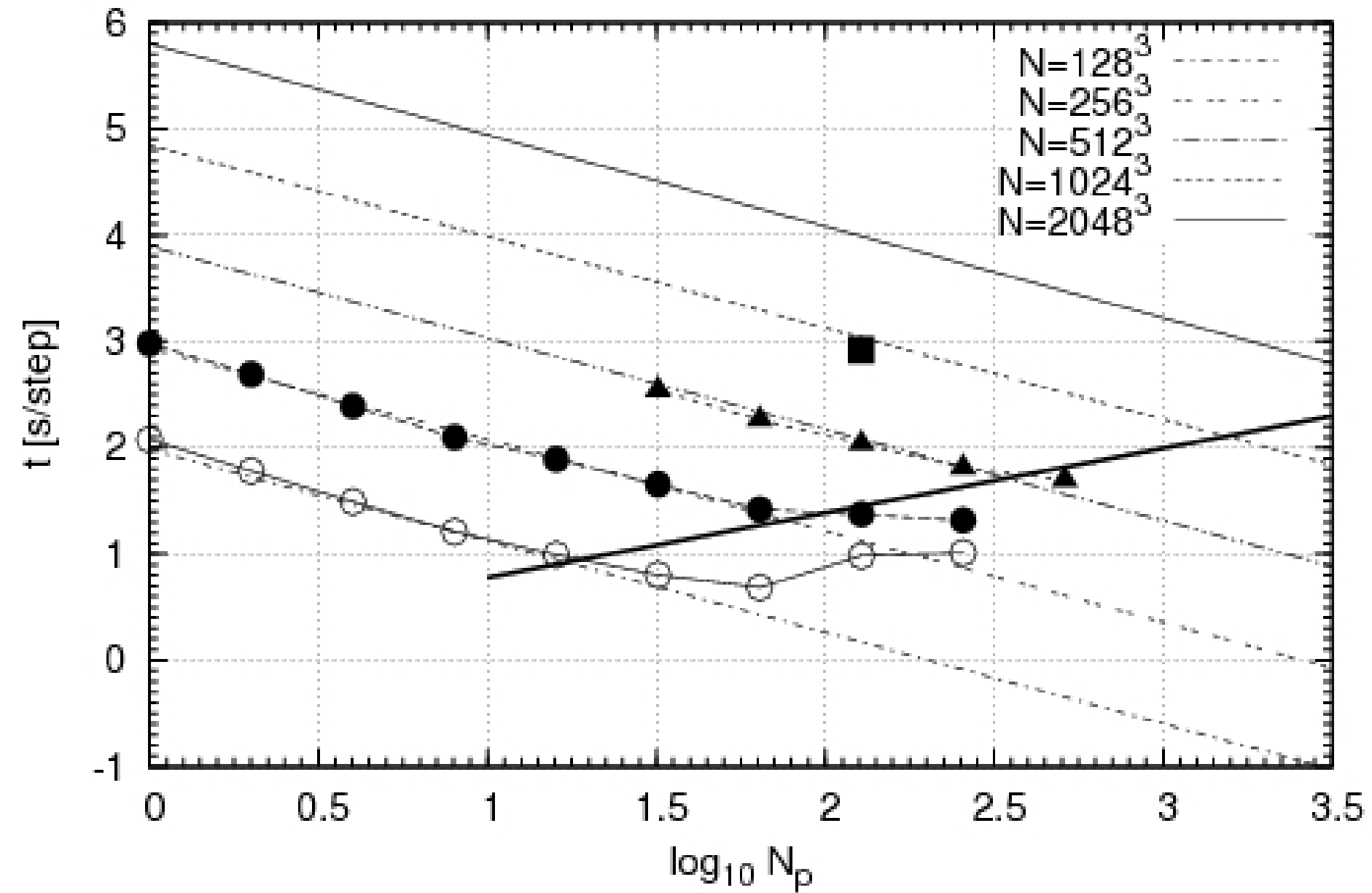
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# Network and parallelization strategy



# Huygens Power5+ measurements



***Questions ?***

