Platelets GPU Team

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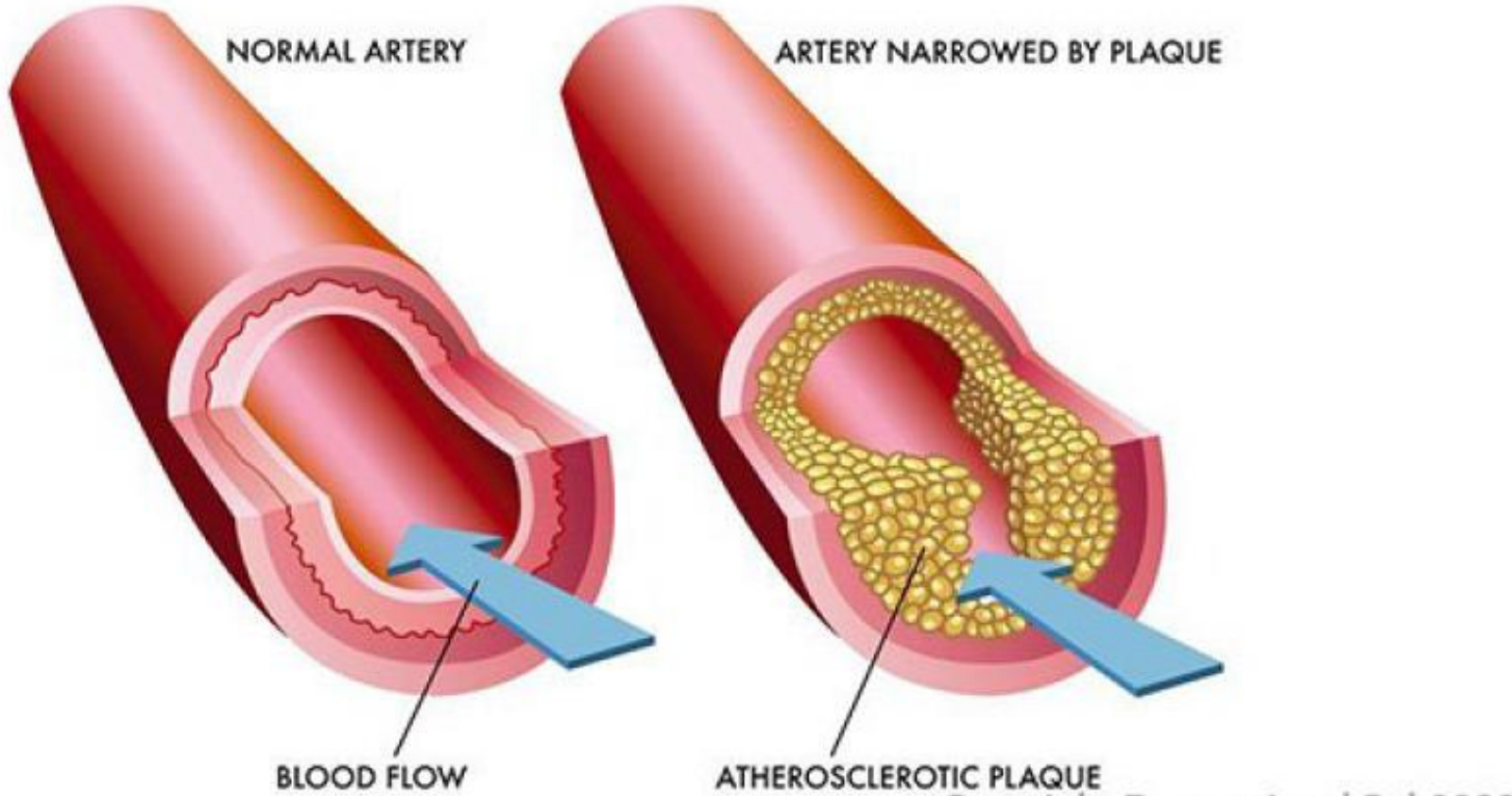
ATHEROSCLEROSIS



Red Blood Cell

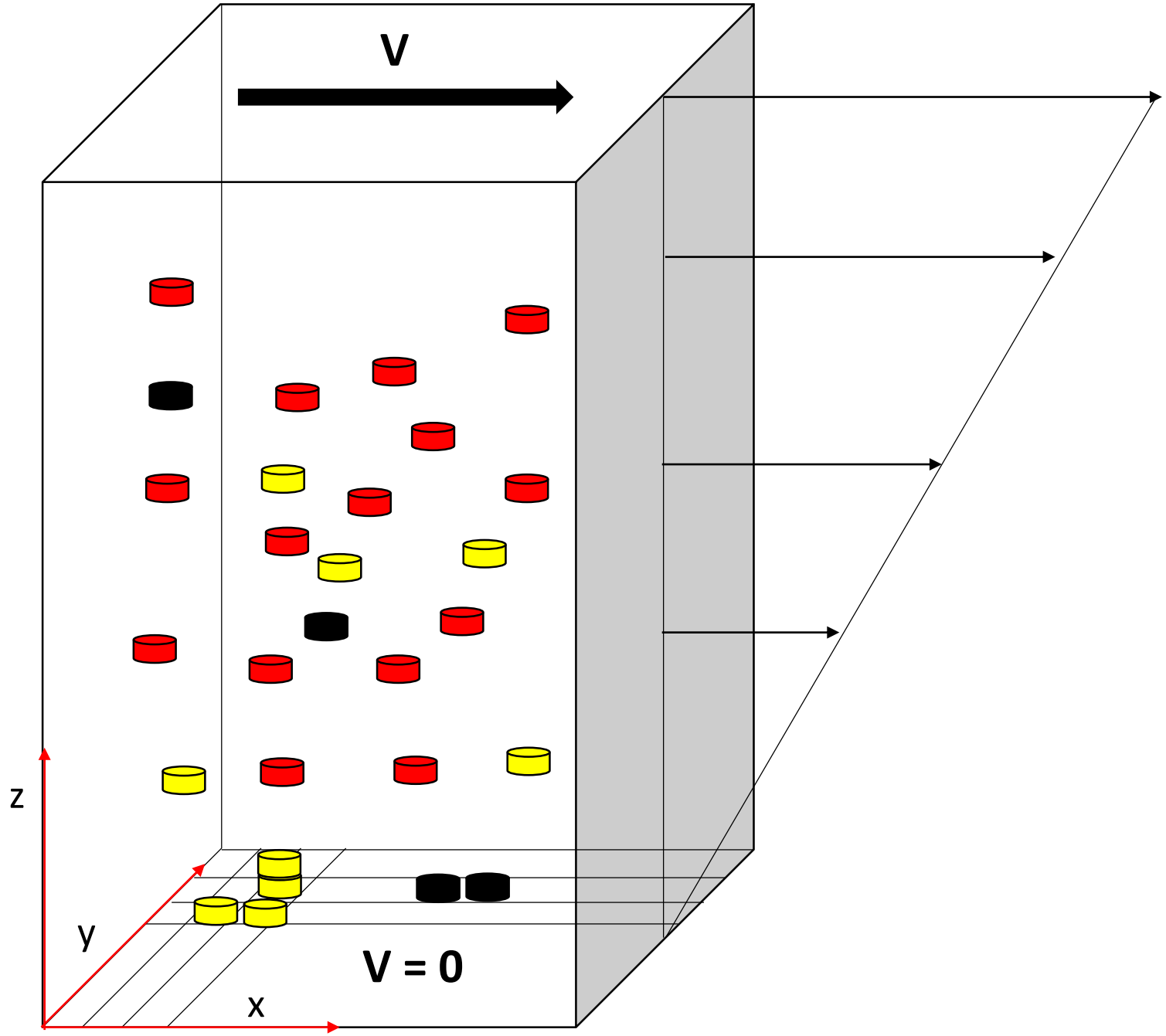
Platelet
(Activated/ Non-Activated)

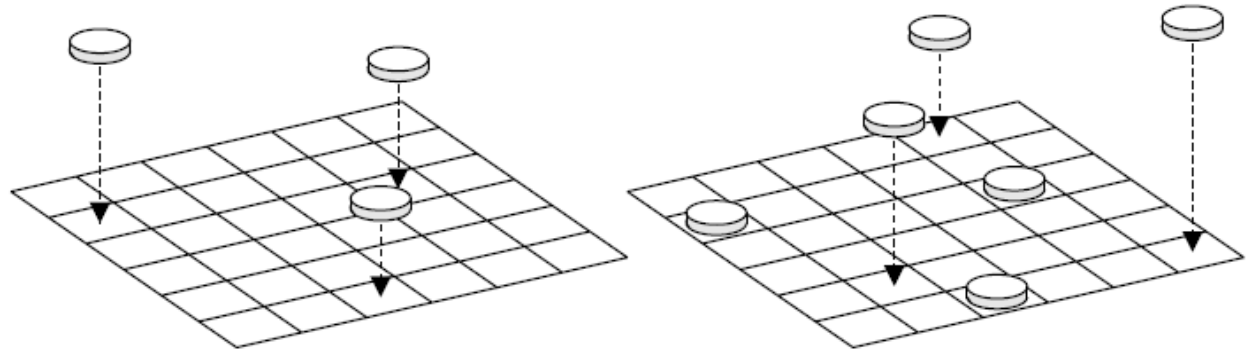
Albumine

XY Plane
Homogeneous Field

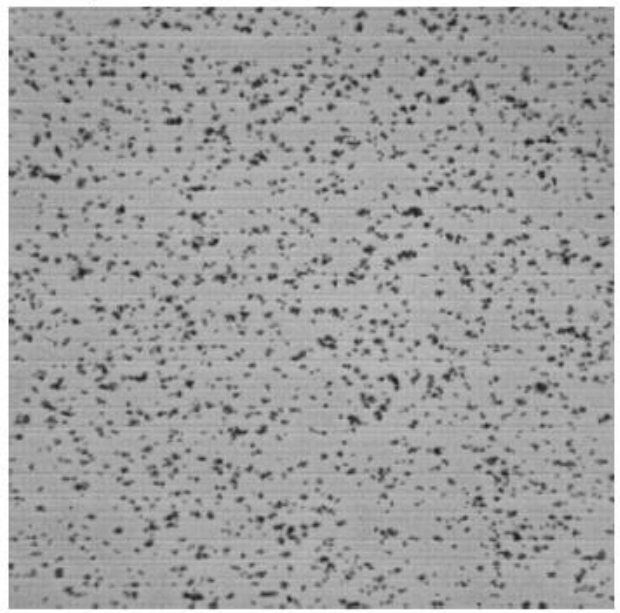
Z-Direction: 1D
Diffusion equation

XY-Plane: 2D
Stochastic Problem

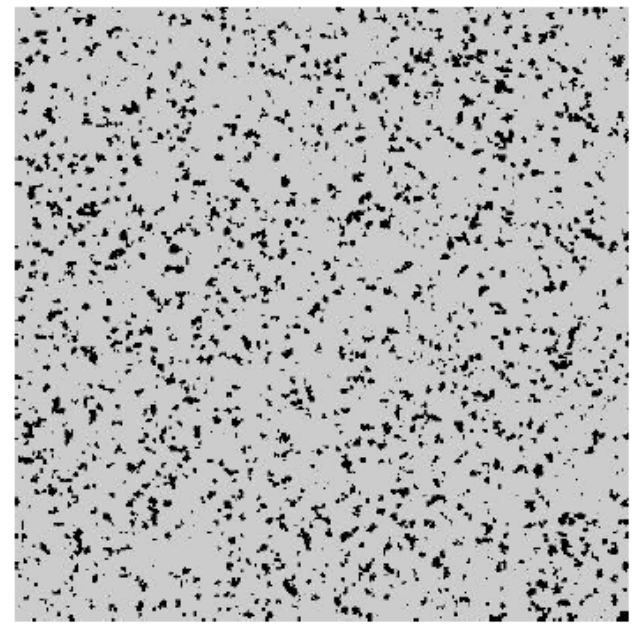




Experiment



Simulation



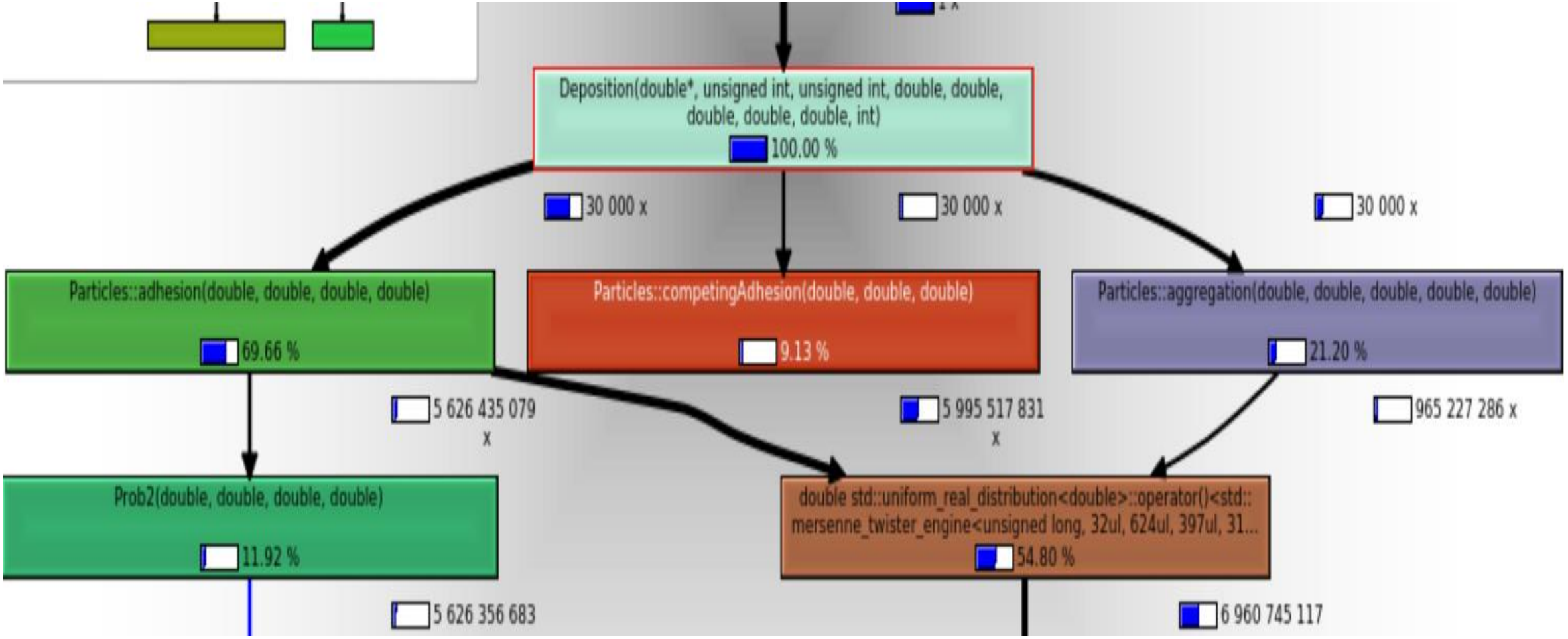
Pseudocode

```
while (t < tmax )
    Solve(1D Diffusion Eqn)

    2D Stochastic Part:
      Solve(Platelets Adhesion)
      Solve(Albumine Adhesion)
      Solve(Platelets Aggregation)

    if ( checkpoint)
        count Clusters/ Aggregates
```

Profiling of CPU Code



Goals

- Parallelize the 2D Stochastic Problem using CUDA
- Generate efficiently Random Number using CuRand
- Run multiple instances of the problem in order to explore the parameter space
- Desired SpeedUp compared to monothread > **x36**
  - ❖ Monothread Simulations: 36 on a node of Daint
  - ❖ GPU should compete in terms of node utilization