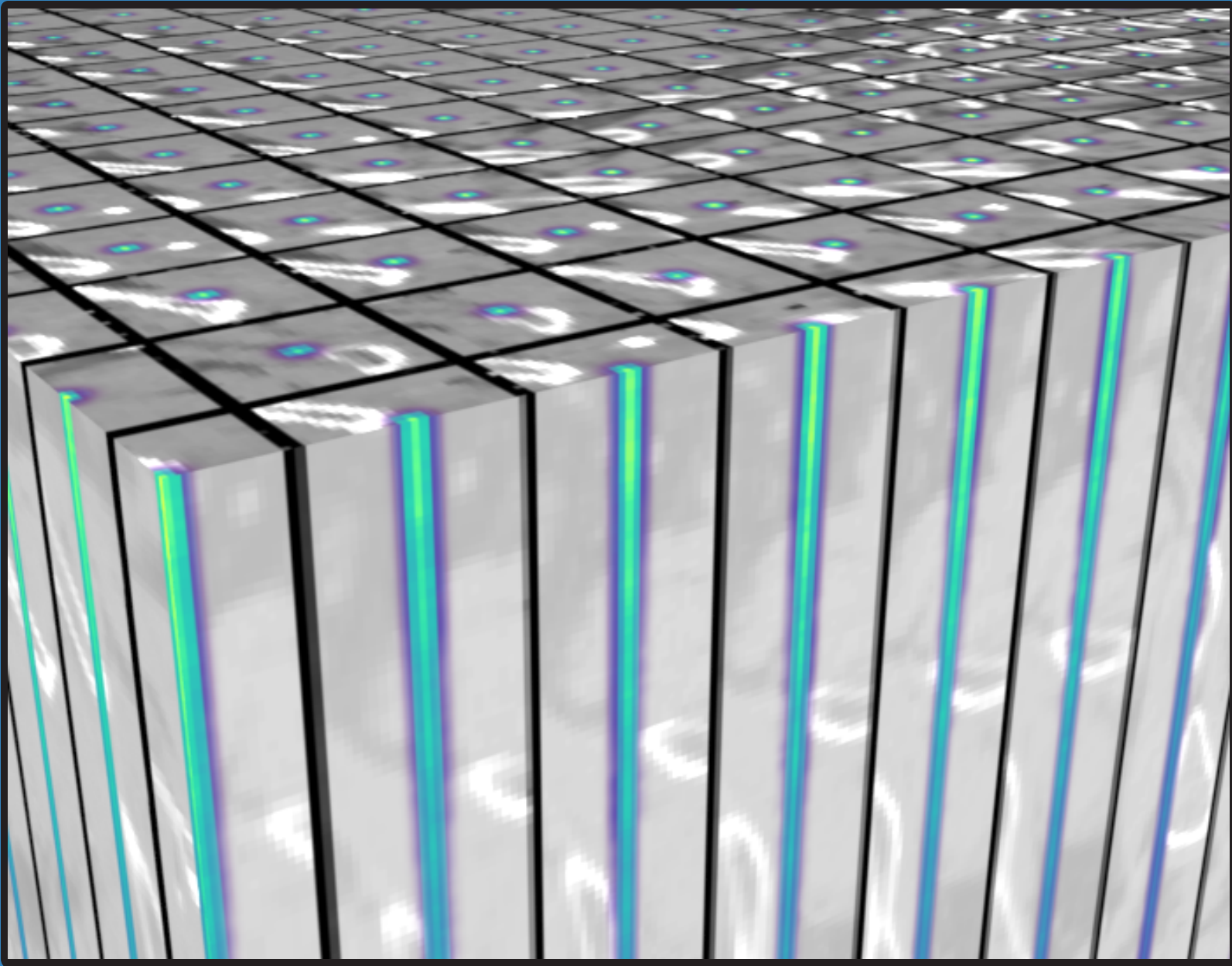


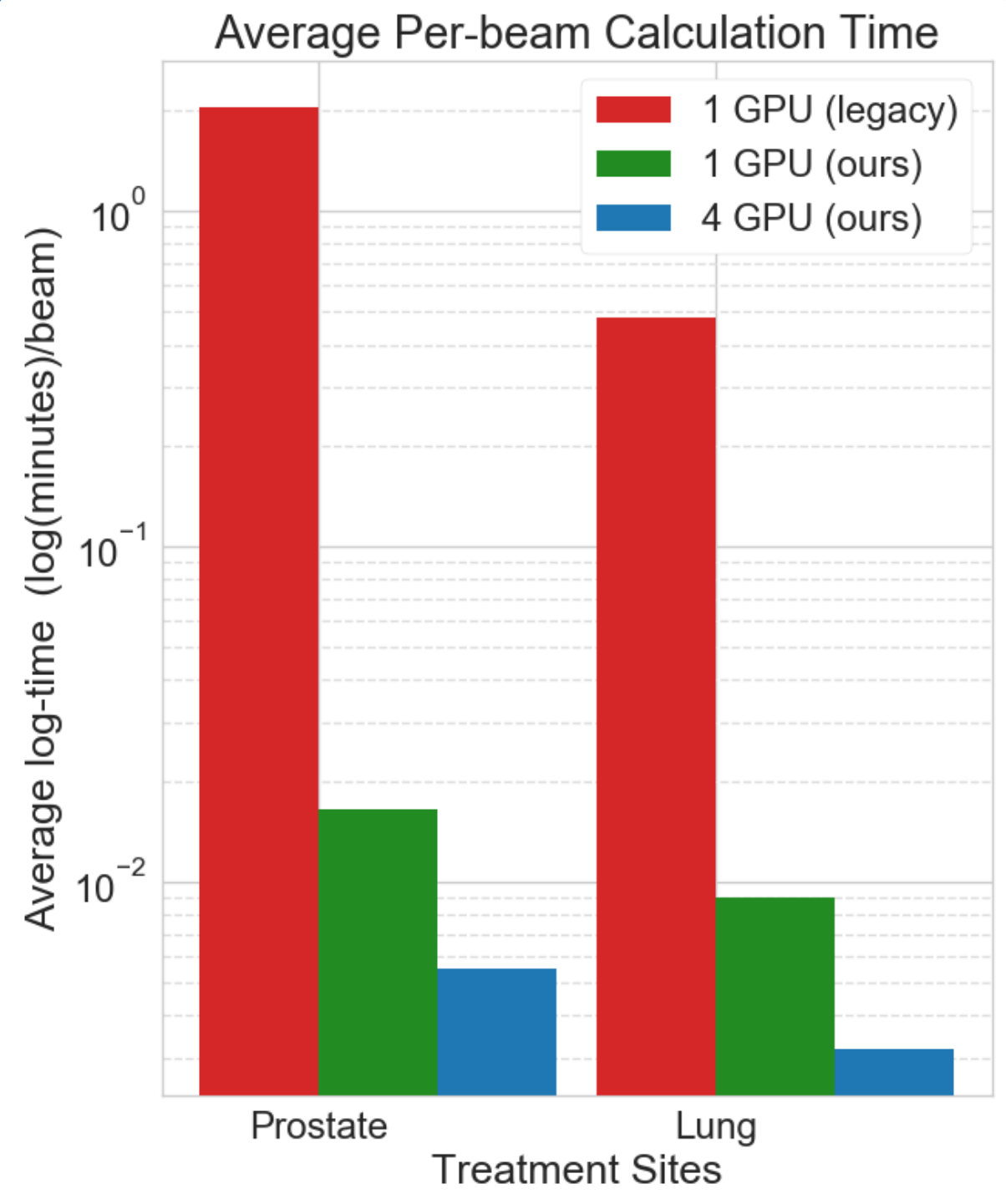
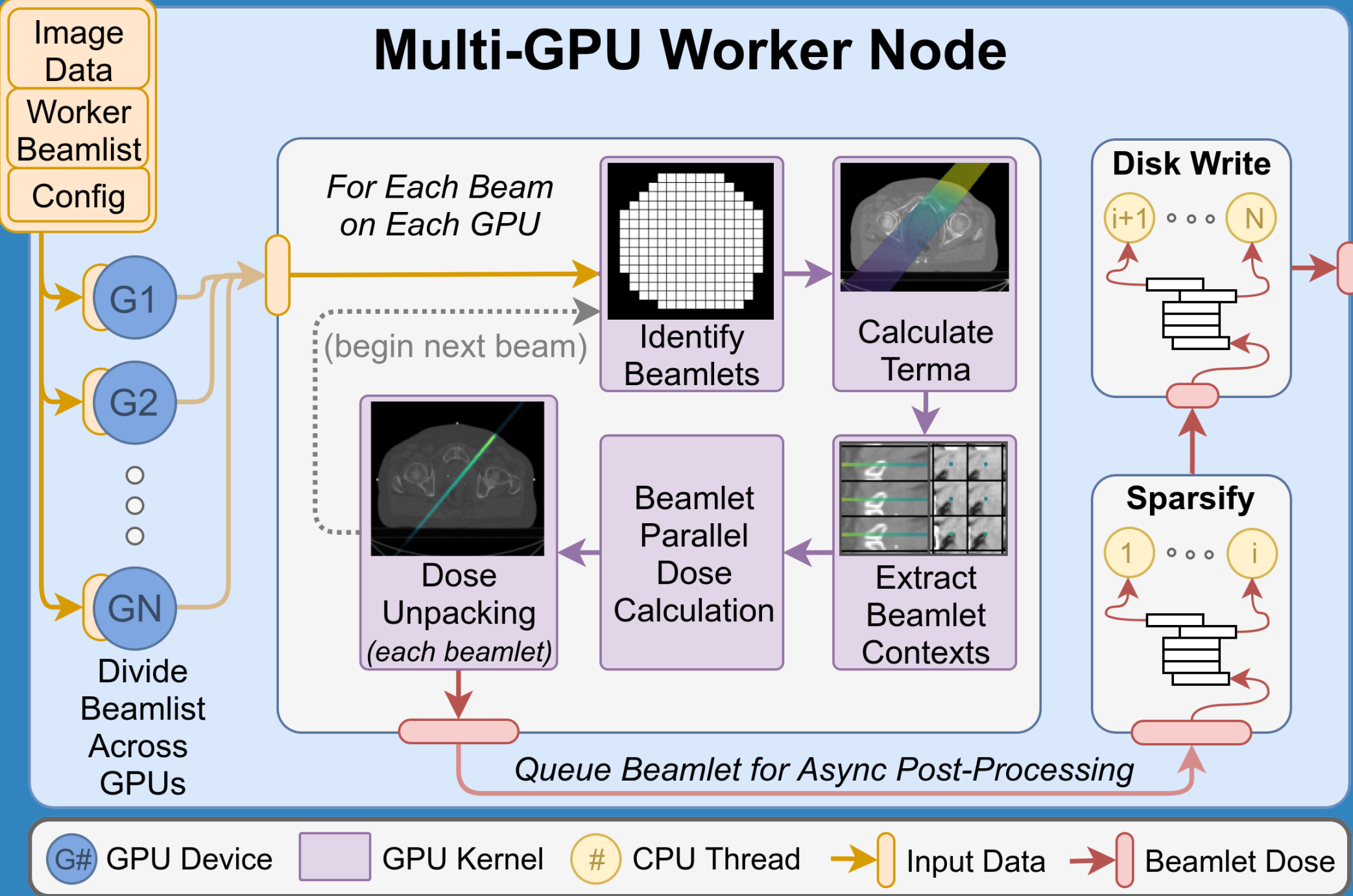
# Distributed Multi-GPU Photon Beamlet Dose Calculation for Efficient Radiation Treatment Planning



Beamlet-aligned data **contexts** are isolated into a grid structure where efficient beamlet-parallel dose convolution occurs. Beamlet-specific dose is extracted and used for fluence map optimization.

### 3 levels of parallelization are used:

- 1) Each GPU computes beamlet dose in parallel using **contexts**
- 2) Beams are processed simultaneously on separate GPUs
- 3) Worker nodes manage a set of GPUs and return their calculation results to the master node.



Ours (1 GPU) shows greater than **~53x** speedup over an existing single GPU beamlet-based CCCS method (**~150x** on 4 GPUs)