Deriving the Approximate Algorithm

Key Result

- The resulting cells *c* of fixed dimension *d* are all **well-separated** geometrically with a collar[1] of enough margin.
    - Due to the expanded regions of dimension $d' \neq d$, rule (reaction) instances R, and R' commute to high accuracy if assigned to different cells c, c' of same dimensionality.
    - Assignment is by some rule (reaction) instance allocation function φ.

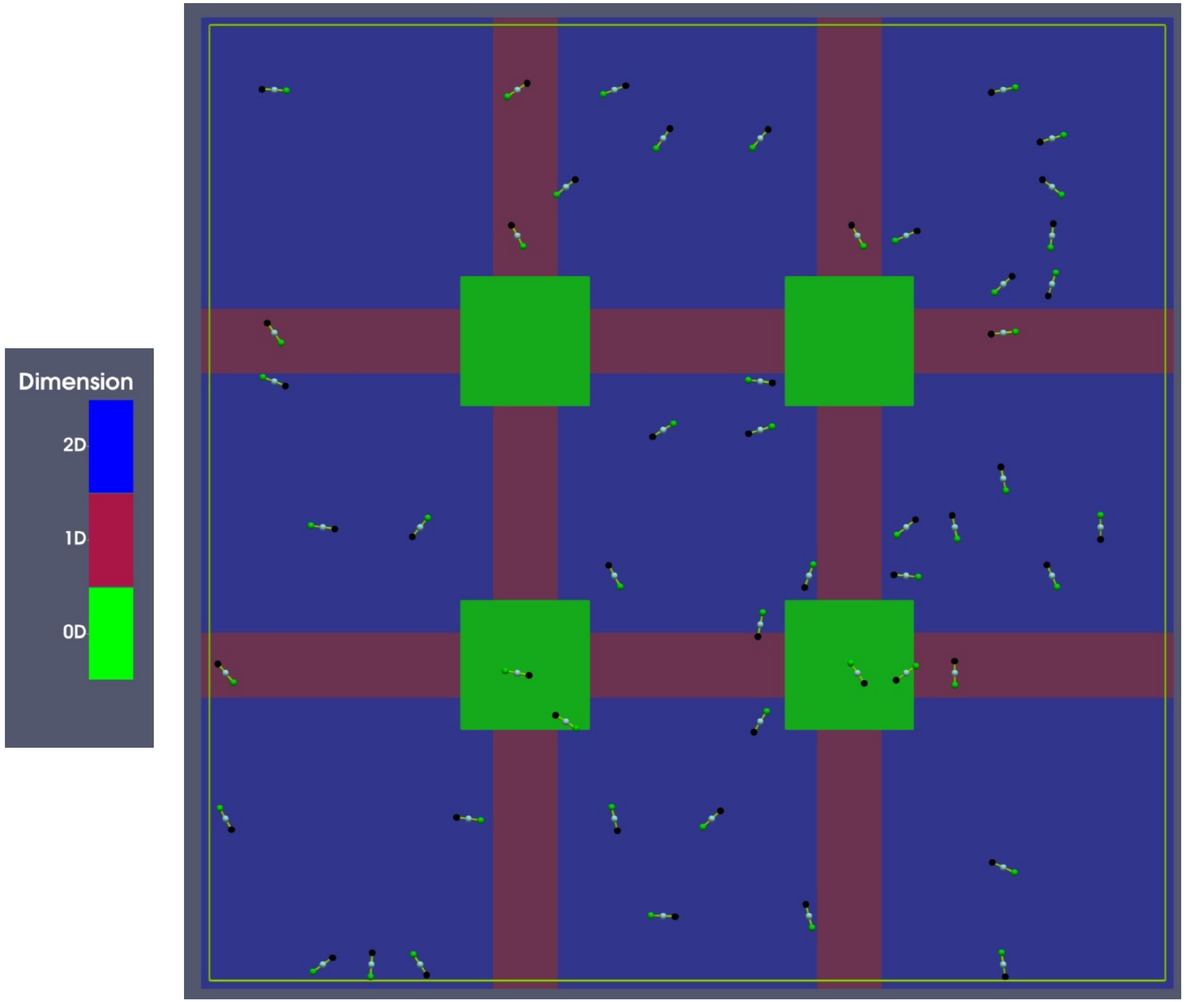

Figure 15: Initialized simulation space, with expanded cell complex, expanded cells are larger enough to hold

1. (Rand and Walkington, 2009)

Mapping Rules to Geometric Cells (geocells)

The φ function

- φ assigns a geocell to every match.
- φ partitions the set of matches.
- Example choices for φ are mapping the rule using a single point or the minimum dimension of all points.
- Example search patterns:

1. $\blacksquare_1 - \bigcirc_2 - \bullet_3$
2. $(\bigcirc_1 - \bullet_2, \bigcirc_3 - \bullet_4)$

- Rules that map to one geocell, may have nodes/edges that map to another!

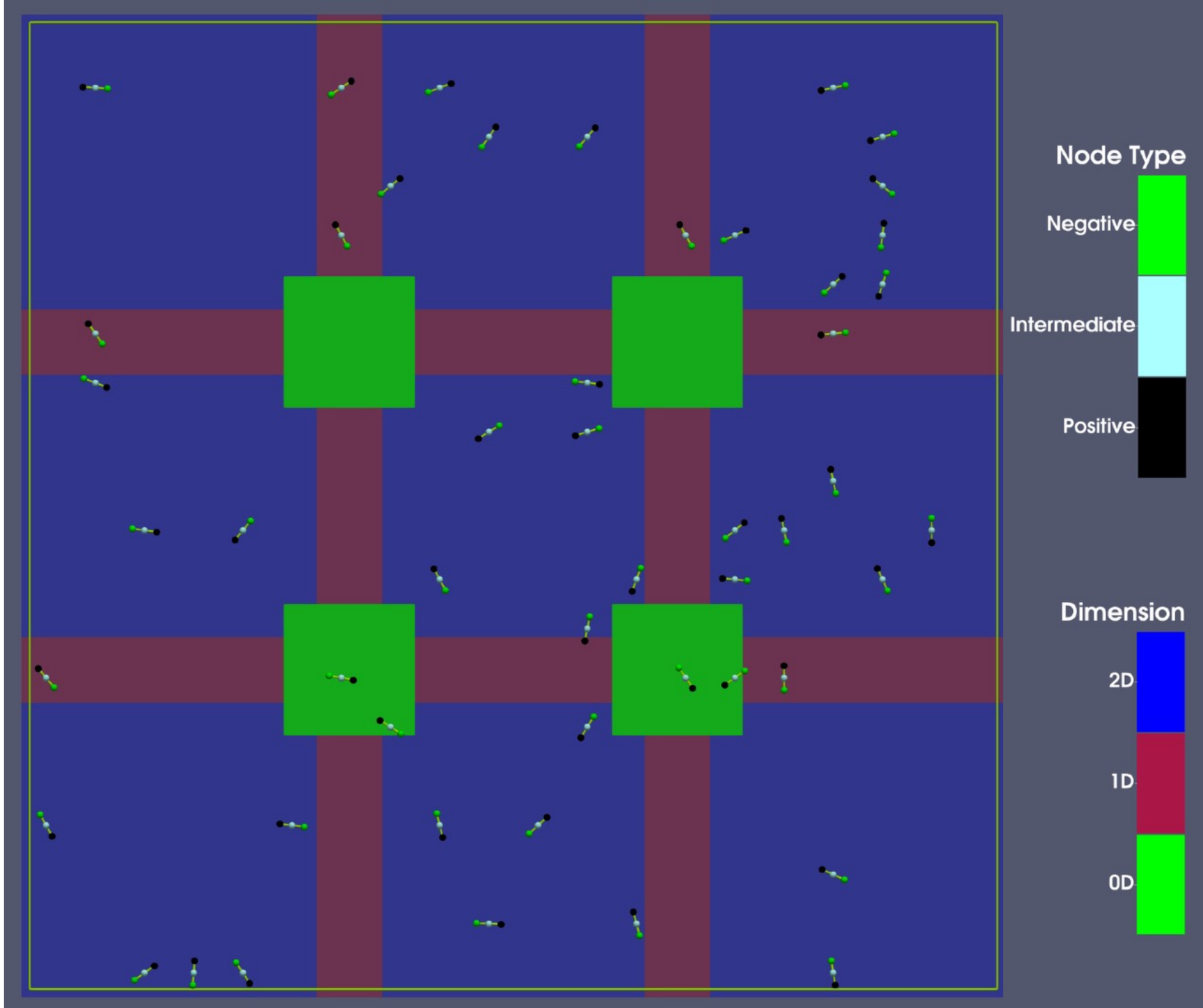

Figure 16: