

The ρ 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:

$$1. \quad \blacksquare_1 \text{ --- } \bigcirc_2 \text{ --- } \bullet_3$$

$$2. \quad (\bigcirc_1 \text{ --- } \bullet_2, \bigcirc_3 \text{ --- } \bullet_4)$$

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

Mapping Rules to Geometric Cells (geocells)

2

3

Node Type

Negative

Intermediate

Positive



Dimension

2D

1D

0D



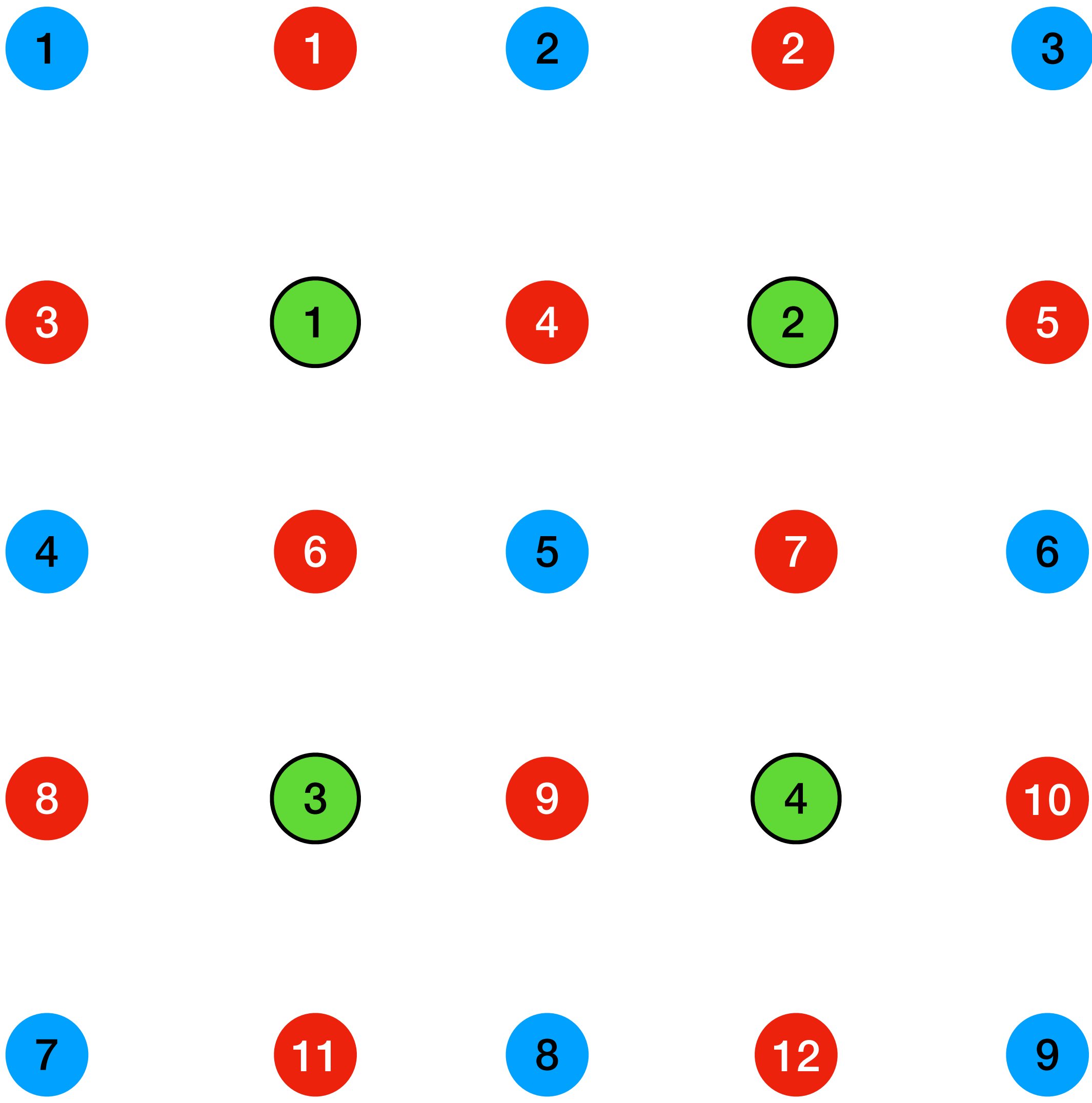


Figure 16:

Mapping Rules to Geometric Cells (geocells)

The φ function

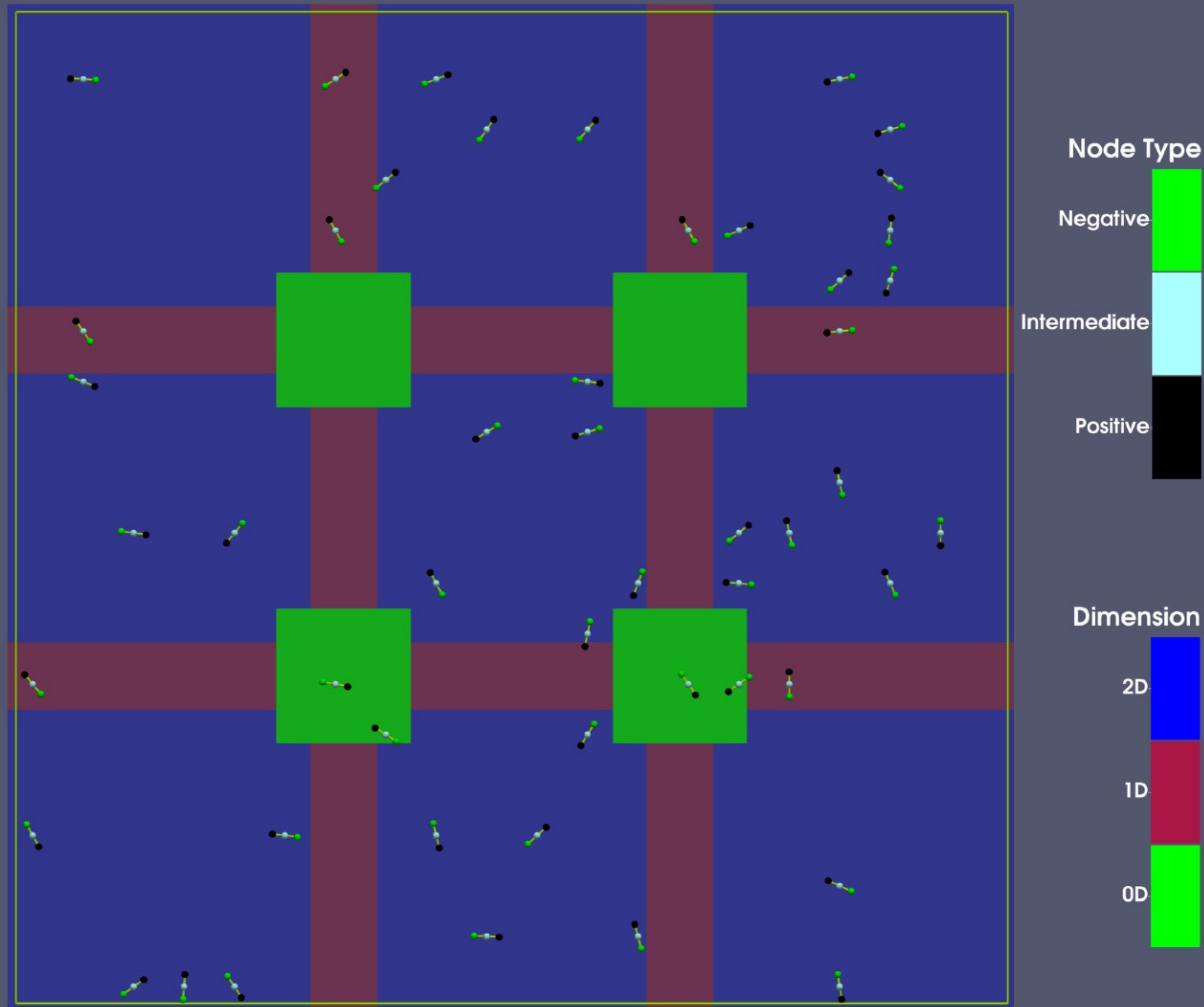
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The Reaction Grid

Context for the cell list

- A cell list¹ is a data structure to find combinations of objects within a given cut-off distance of each other.
 - Cell size defined using a user defined reaction radius.
 - Enables efficient geometric search of nearby objects and combinatorial matching of nearby components.
- The cell list is integral in the incremental update.
- The cell list can be used in the rule mapping function φ .
- Other potential methods are bounding volume hierarchies², k-d trees³, etc.

1. (Slattery, 2022); 2. (Ericson, 2004); 3. (Bentley, 1975)

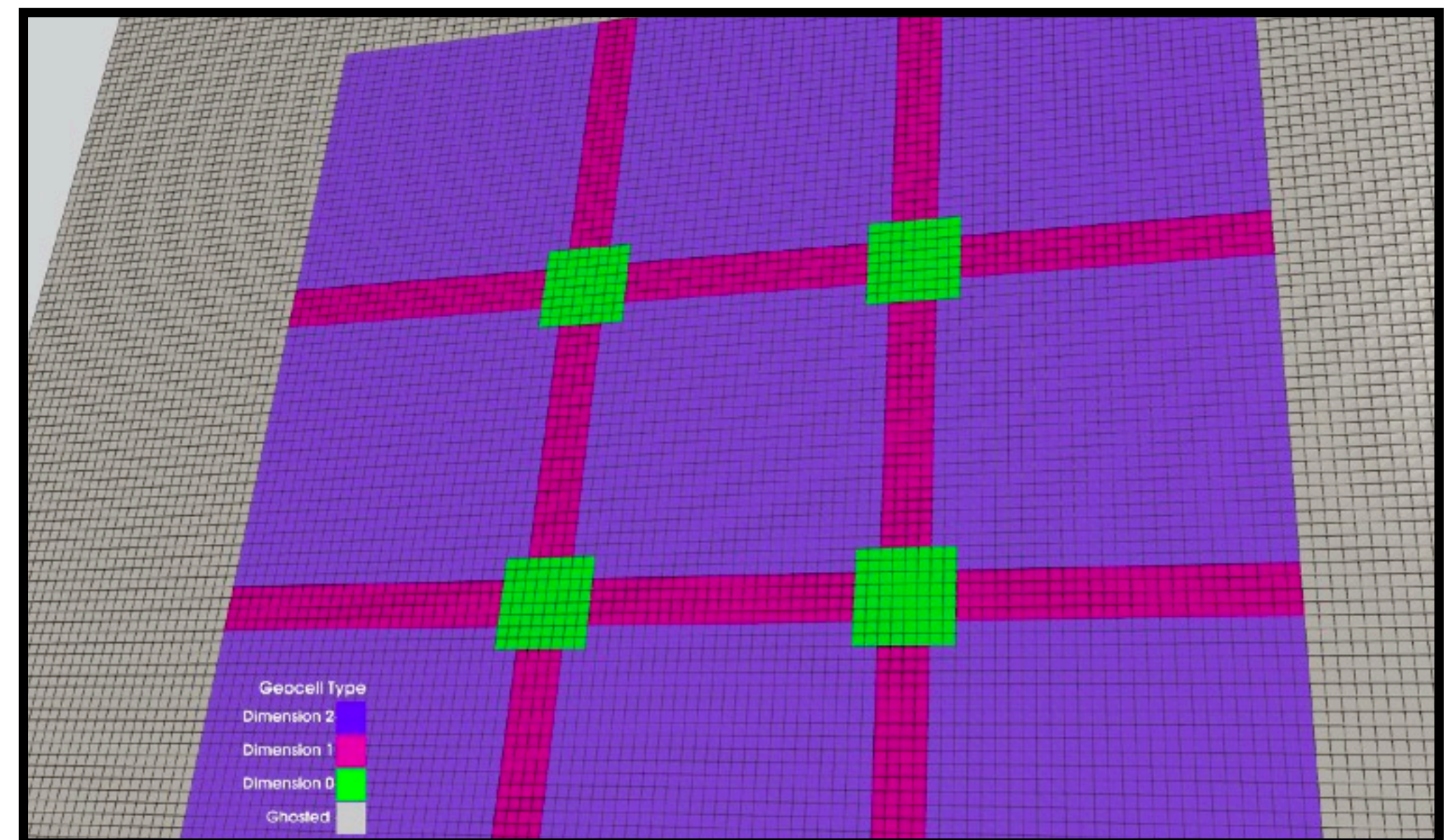


Figure 17: ECC overlaid with a “reaction grid” from a cell list and “ghost cells”.

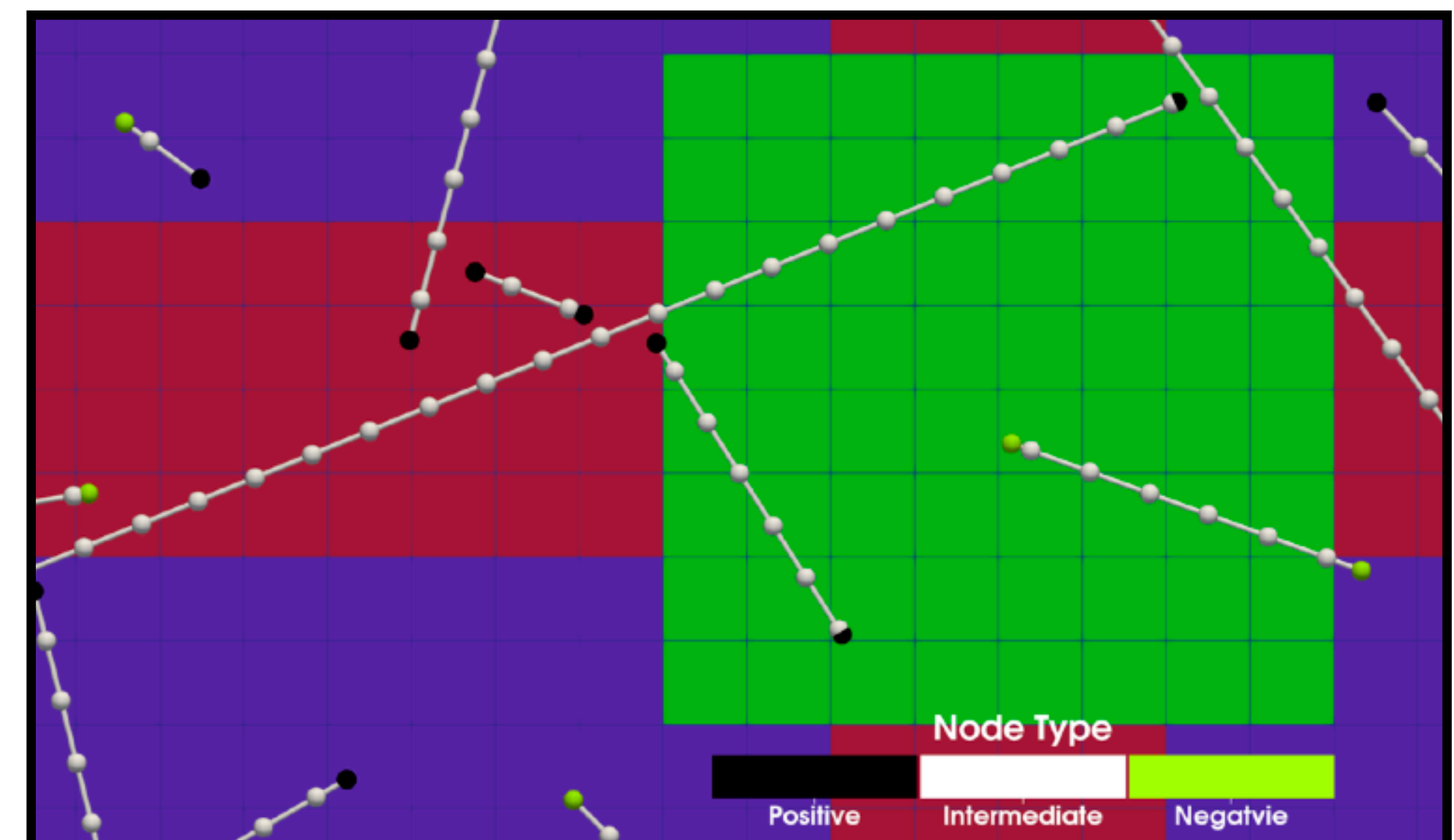


Figure 18: Zoomed in version with graph rules shown.