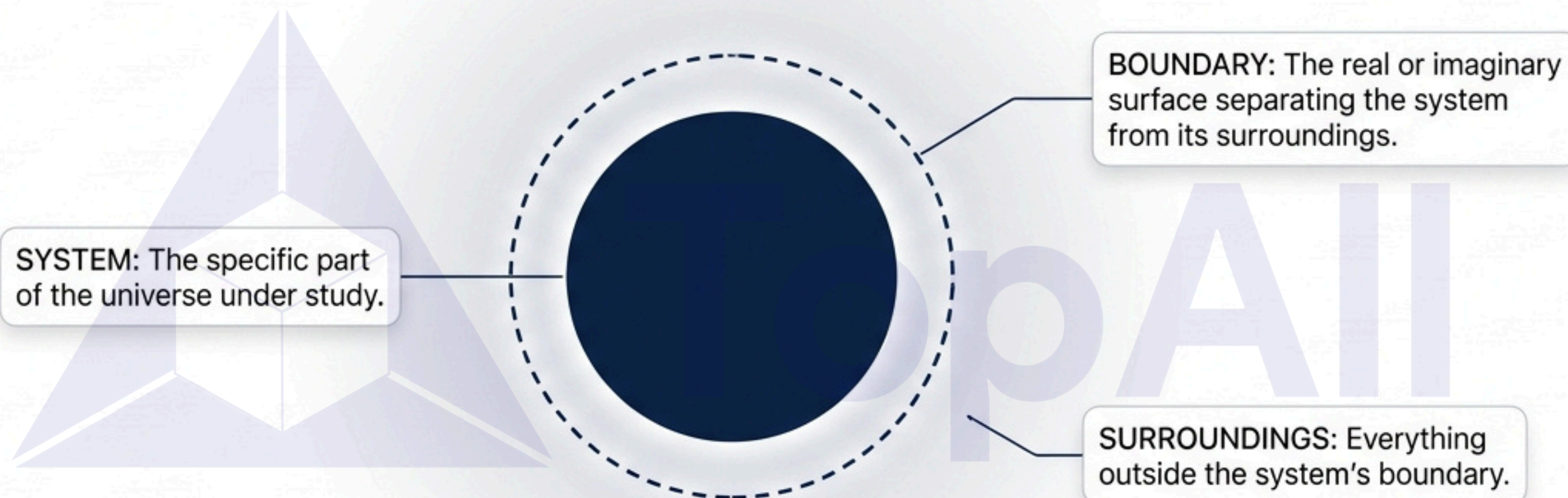


# The System and the Surroundings

Foundational vocabulary for measuring energy changes in chemical reactions.

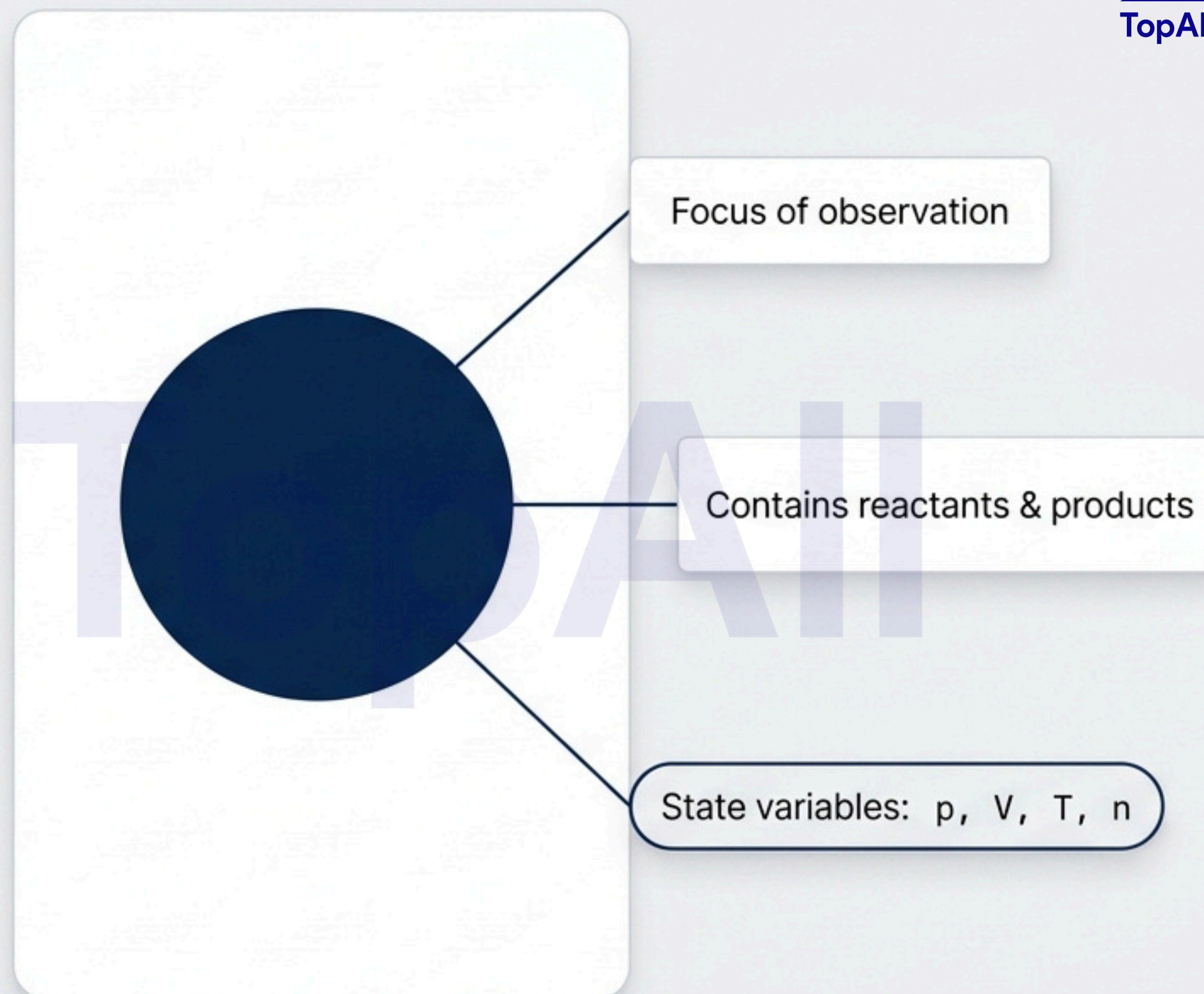


**Key Takeaway:** The boundary defines the system and determines whether energy or matter can be exchanged with the surroundings.

## 01 • THE FOCAL POINT

# What is a 'System'?

In thermodynamics, the system is the specific, microscopic or macroscopic part of the universe where our observations are made and energy changes are measured.





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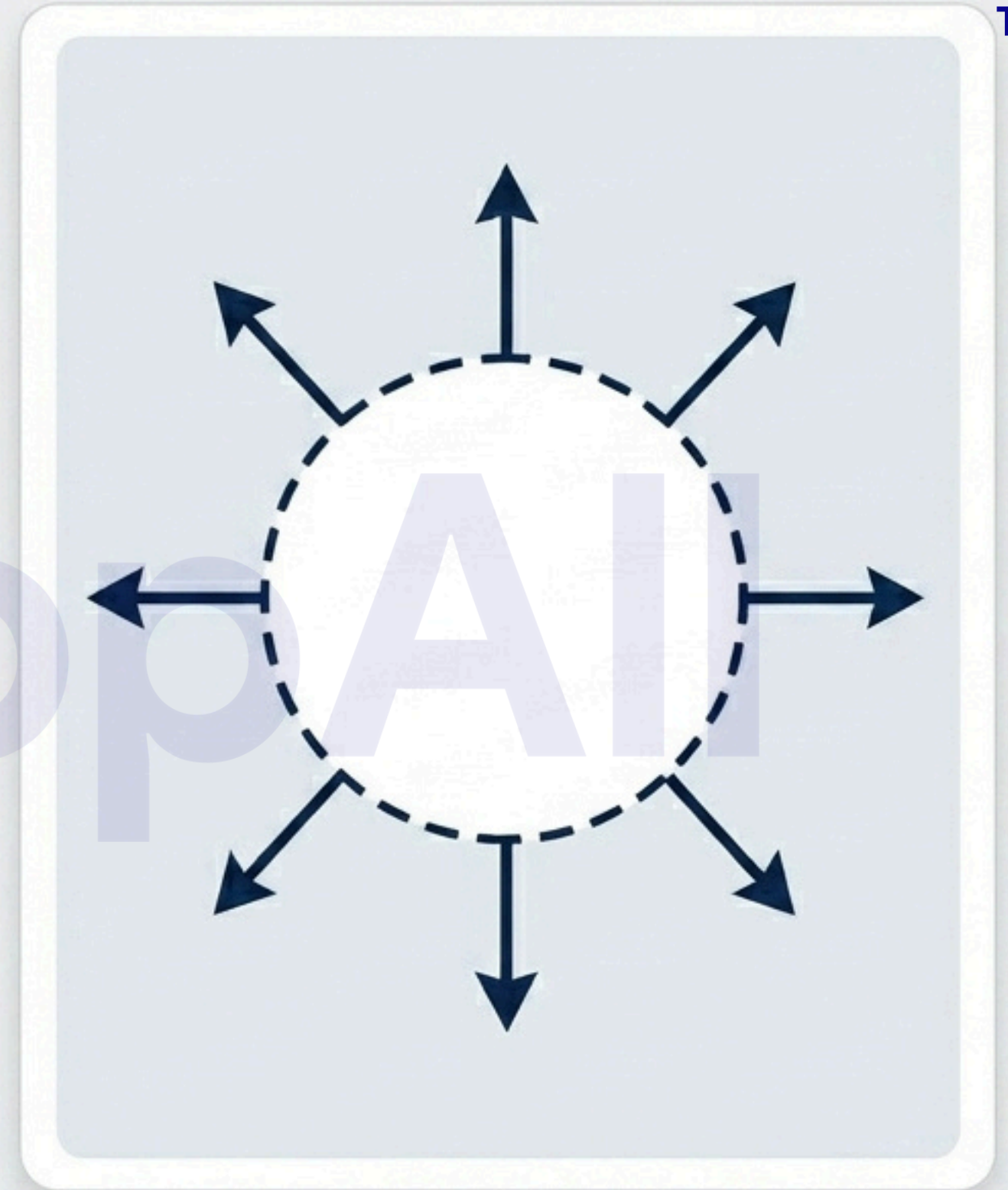


## 02 • THE CONTEXT

# What are the 'Surroundings'?

The surroundings include everything other than the system. However, for practical purposes, it only refers to the immediate region of space that can actually interact with and affect the system.

The rest of the universe is theoretically the surroundings, but only the interacting neighborhood matters for calculations.



# The Thermodynamic Universe

$$[\text{Universe}] = [\text{The System}] + [\text{The Surroundings}]$$



Surroundings

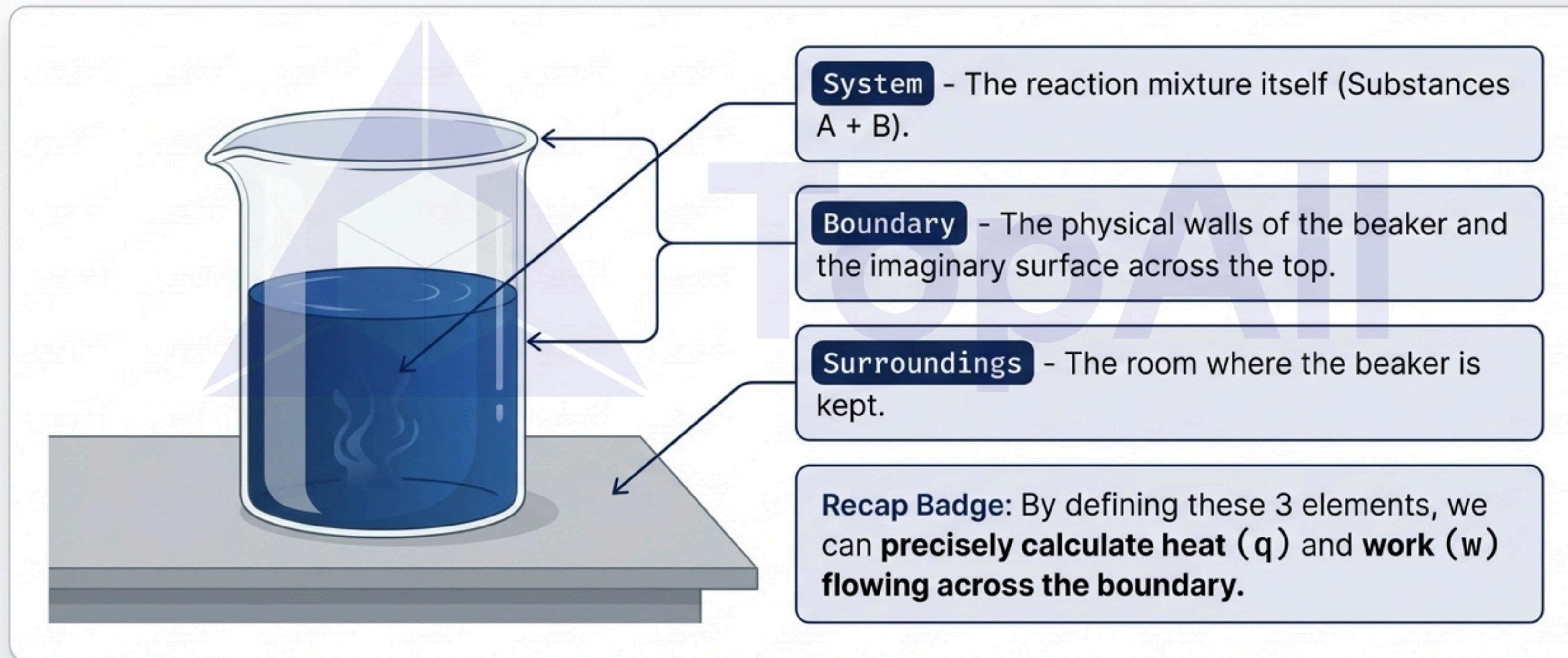
The diagram shows a white 3D cube representing the 'Surroundings' on the left. To its right is a dark blue circle representing the 'System'. A dashed white line forms a boundary around the circle. A horizontal line extends from the text 'The Boundary' on the right to this dashed boundary.

System

## The Boundary

A real or imaginary wall separating the system from its surroundings. It allows us to control and track movements of matter and energy.

# Identifying the Elements in Practice





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