

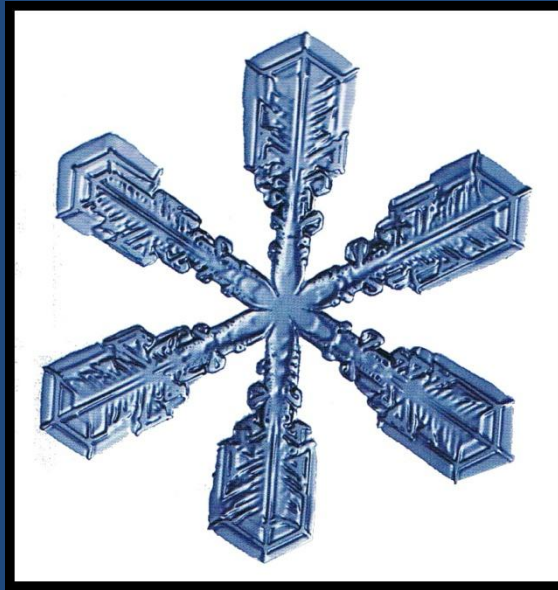
2) Branching and sidebranching



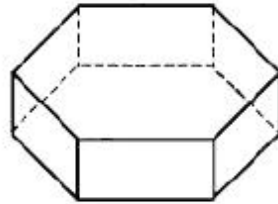
Branching and sidebranching



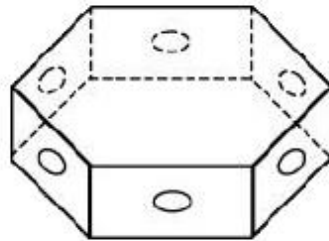
Branching



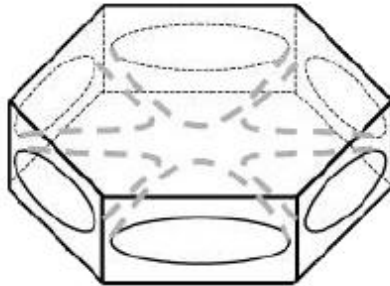
Branching Process



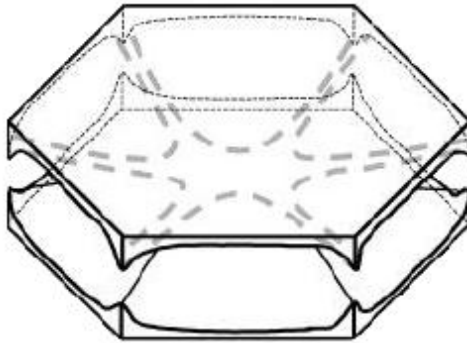
Branching Process



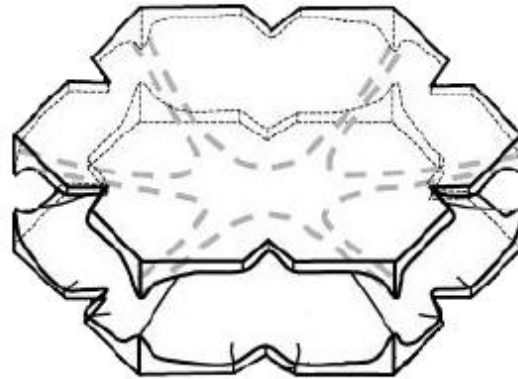
Branching Process



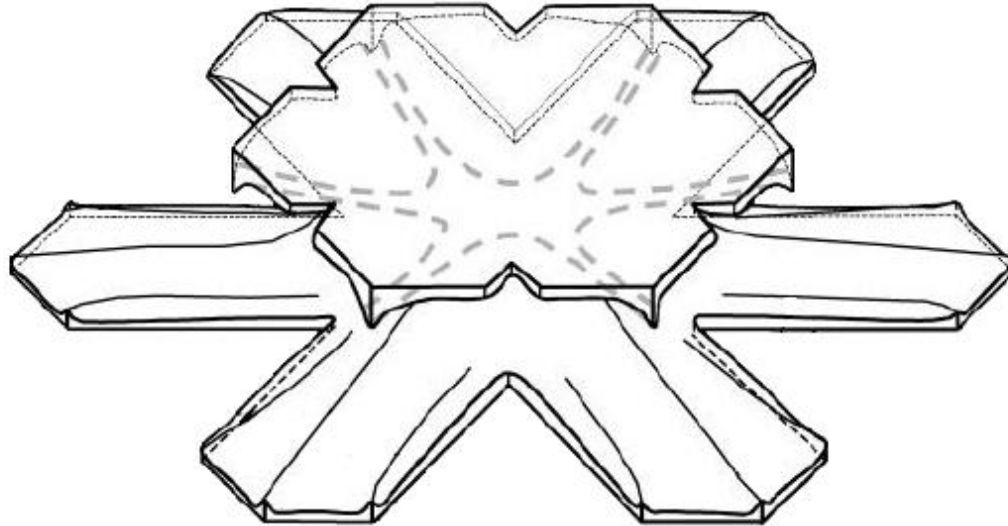
Branching Process



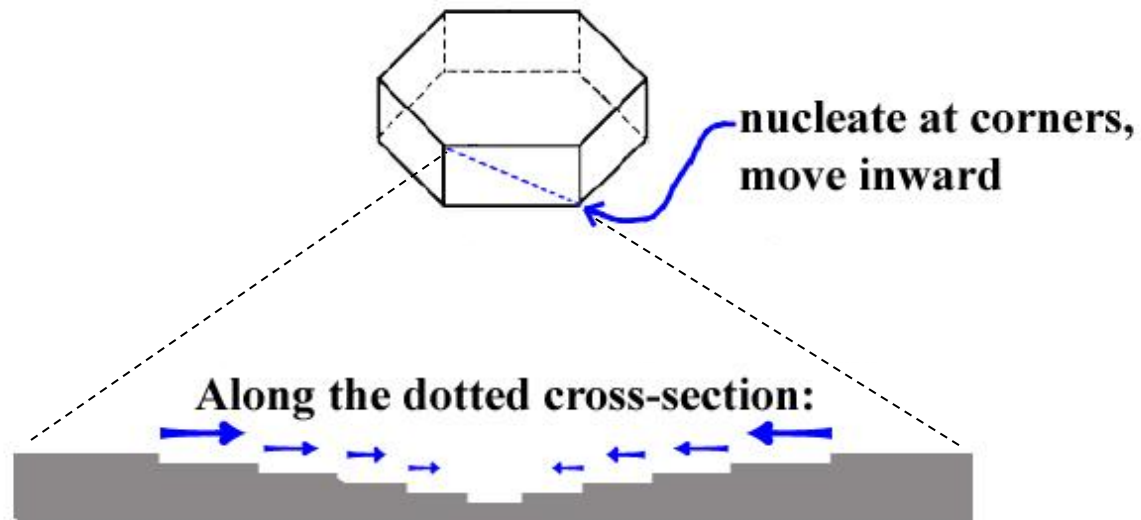
Branching Process



Branching Process



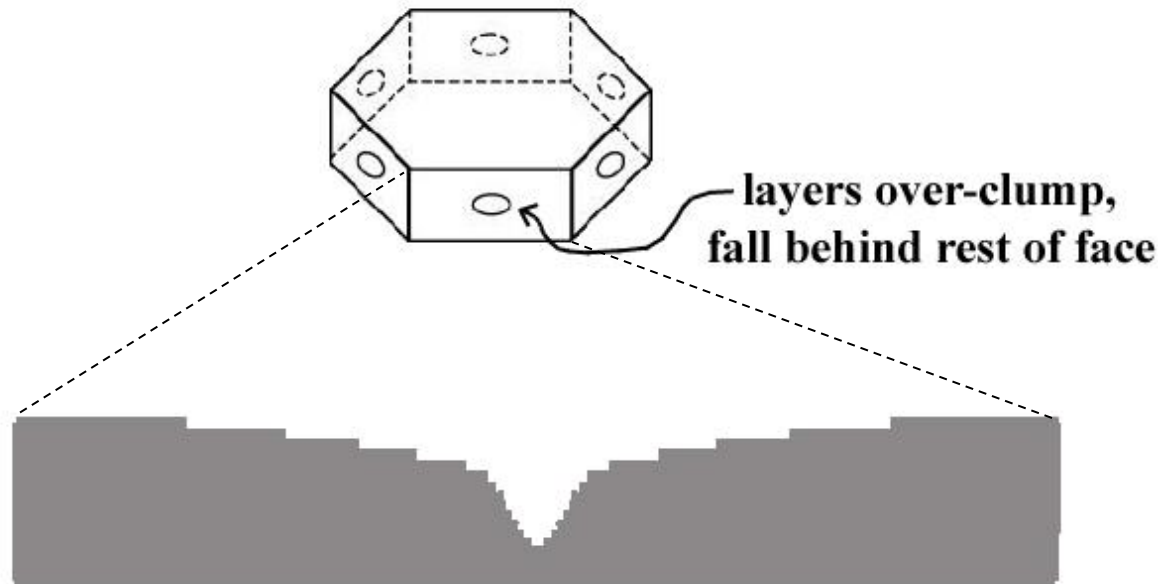
Branching explanation (1 of 6)



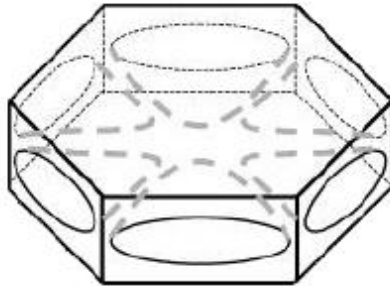
Layers move inward, slow down, cluster & collect vapor more efficiently



Branching explanation (2 of 6)



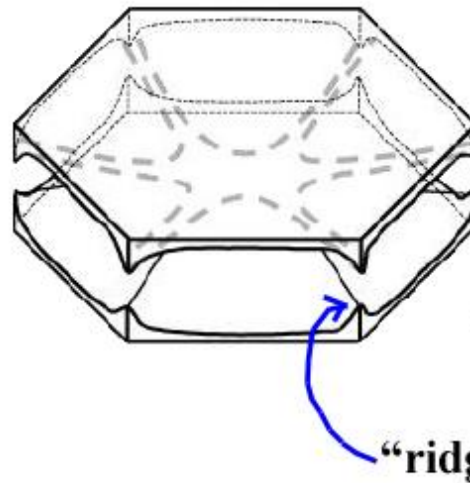
Branching explanation (3 of 6)



As the faces grow in area, the holes spread.



Branching explanation (4 of 6)

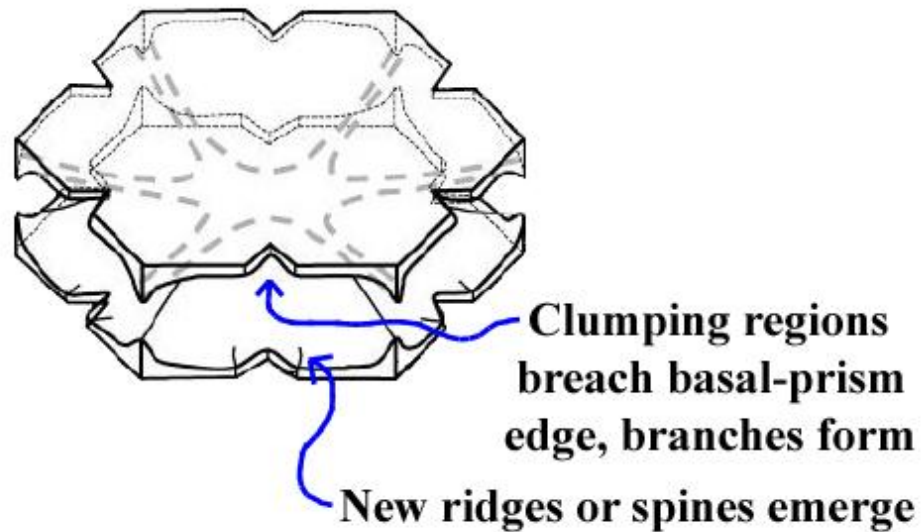


**Holes spread to
prism-prism edges,
dividing crystal into
two levels.**

“ridge” or “spine” forms



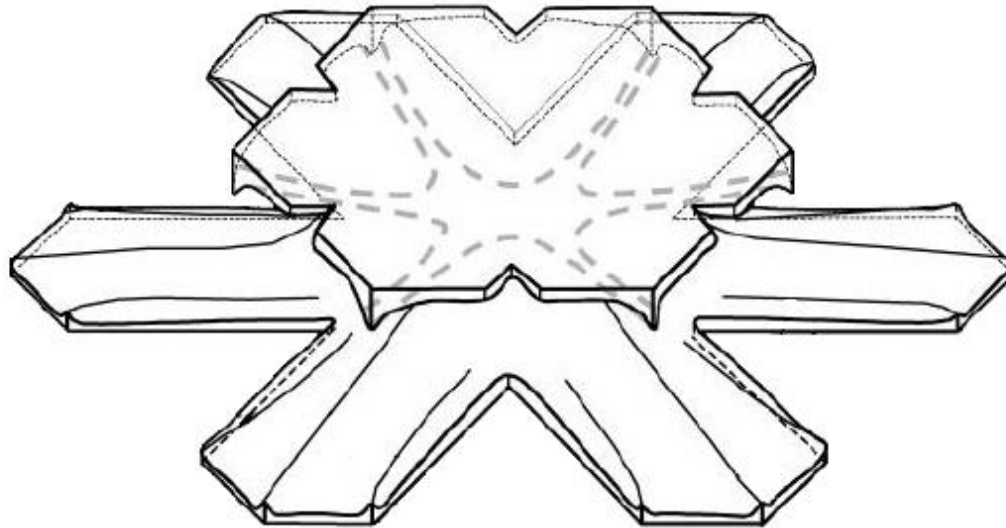
Branching explanation (5 of 6)



Twelve branches sprout



Branching explanation (6 of 6)



An asymmetry causes a branch on one level to grow faster. Branch on other level gets little vapor.

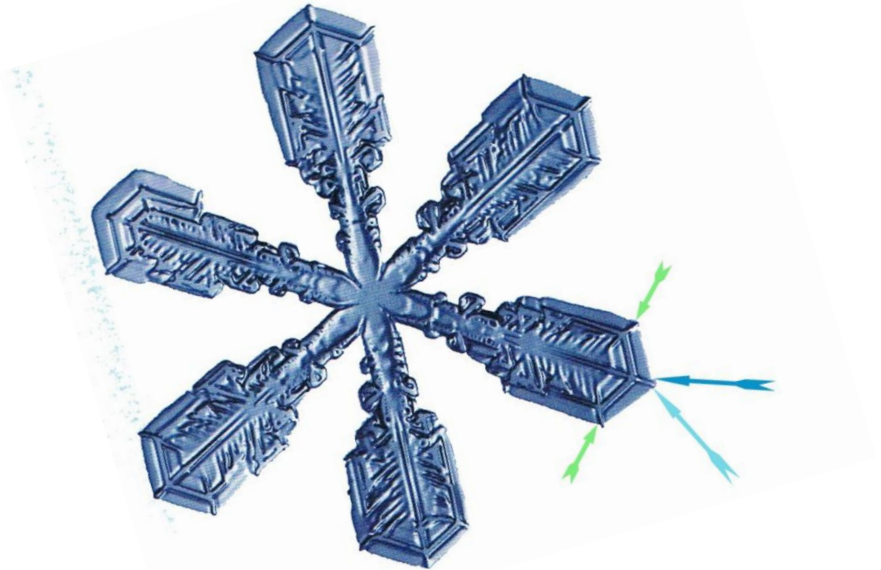
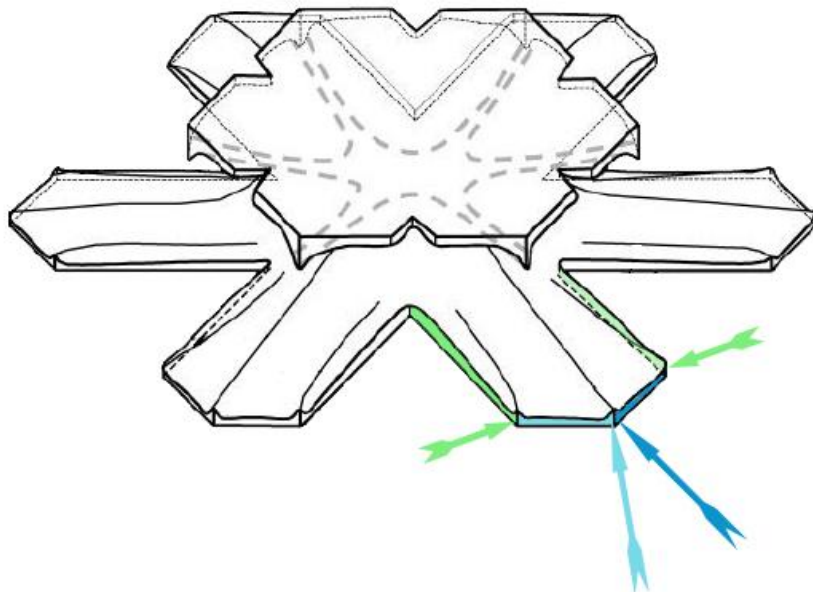


Why six corners?

Why six-fold symmetric?

The initial prism arises from the honeycomb-like molecular structure of regular ice, but **does not** explain Kepler's "six-corners":

For each branch to be similar, yet with correct symmetry, the prism faces must grow by layer nucleation. No crystal could have enough defects to ensure symmetry via the defect mechanism.



Layer nucleation points = same on each branch → symmetric



Sidebranching

