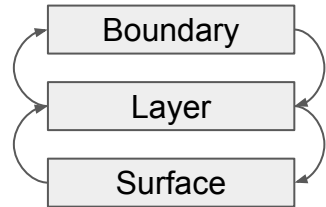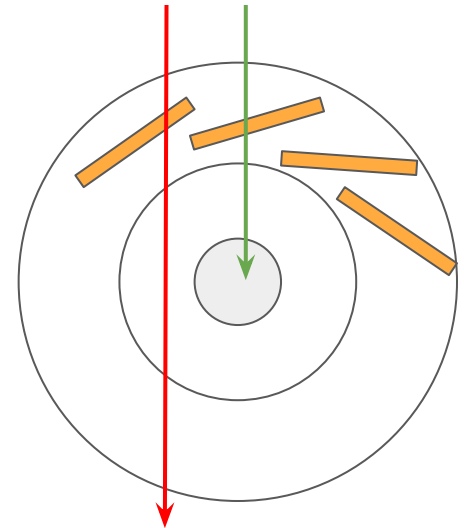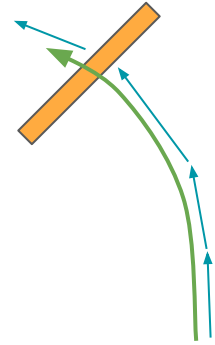# Navigation in ACTS

ACTS Workshop 2023

Navigation: State in ACTS

- Part of the propagation like Stepper, Actors, Aborters
- Instructs the Stepper to advance a specific distance on track
- This is based on the position of the next geometry object
- Navigator gets called before and after each Stepper step
- Hierarchical structure: Boundary, Layer, Surface

- Recent discoveries
  - Navigation depends highly on the path limit set by the aborters
    https://github.com/acts-project/acts/pull/2595
  - Navigation is coupled to target finding
    https://github.com/acts-project/acts/pull/2611

Navigation: Plans

- Rewrite navigation to remove hierarchy   +917 −1,866
  https://github.com/acts-project/acts/pull/2625
  - Only two modes: In layer or in volume
  - Layers act like subvolumes
  - Simplifies navigation and removes edge cases
  - Fail fast instead of trying to continue navigation at all cost
  - **Todo:** Check physmon residuals for GSF
  - **Todo:** Do we need BVH navigation?
- Rewrite navigation for new detector geometry
  - Can this converge with the plan above?