

• but, out of designer control: impact impulses can be added

• their barycenter

• their momentum of inertia -

• angular velocity is maintained

somewhat believable bounces on "impacts"

to be

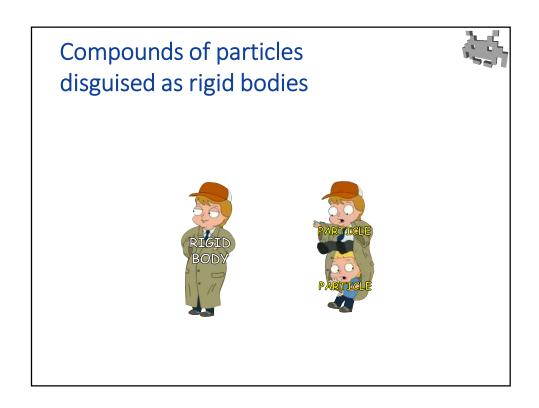
computed

(or stored)

disallowing

compene-

tration



Game Physics - 4

## Particles compounds or rigid bodies?



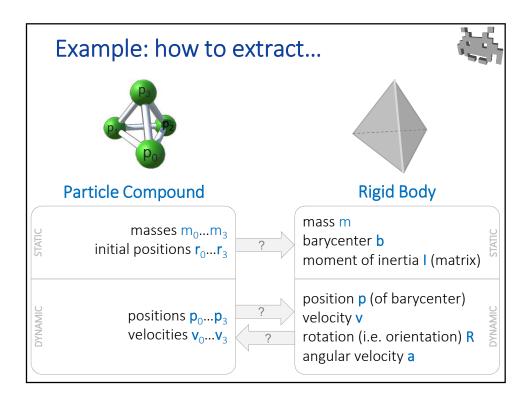
- Rigid-body based systems:
  - explicitly compute dynamics for rigid bodies
  - updating their rotation, angular speed,...
- Particles-based systems:
  - only compute dynamics for particles
  - rigid (or deformable, or jointed) bodies as an emerging behavior
- Mixed:
  - use both
  - bonus: dynamically swap between the two representations for rigid bodies

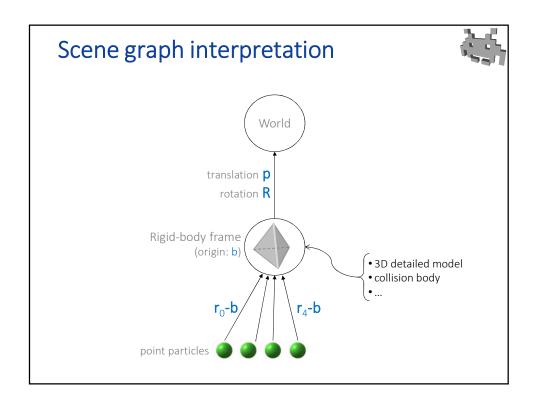
## Particle-based systems: Challenges



- Approximations introduced
  - e.g.: mass concentrated in a few locations
- Scalability issues
  - many constraints to enforce, many particles to track
- Some of the data which is kept implicit is needed by the rest of the engine
  - and therefore must be extracted 🕾
  - e.g.: (rotation) of a the "rigid body"
    - (needed for rendering!)
  - and: its angular speed, barycenter pos, velocity...

Game Physics - 4





Game Physics - 4