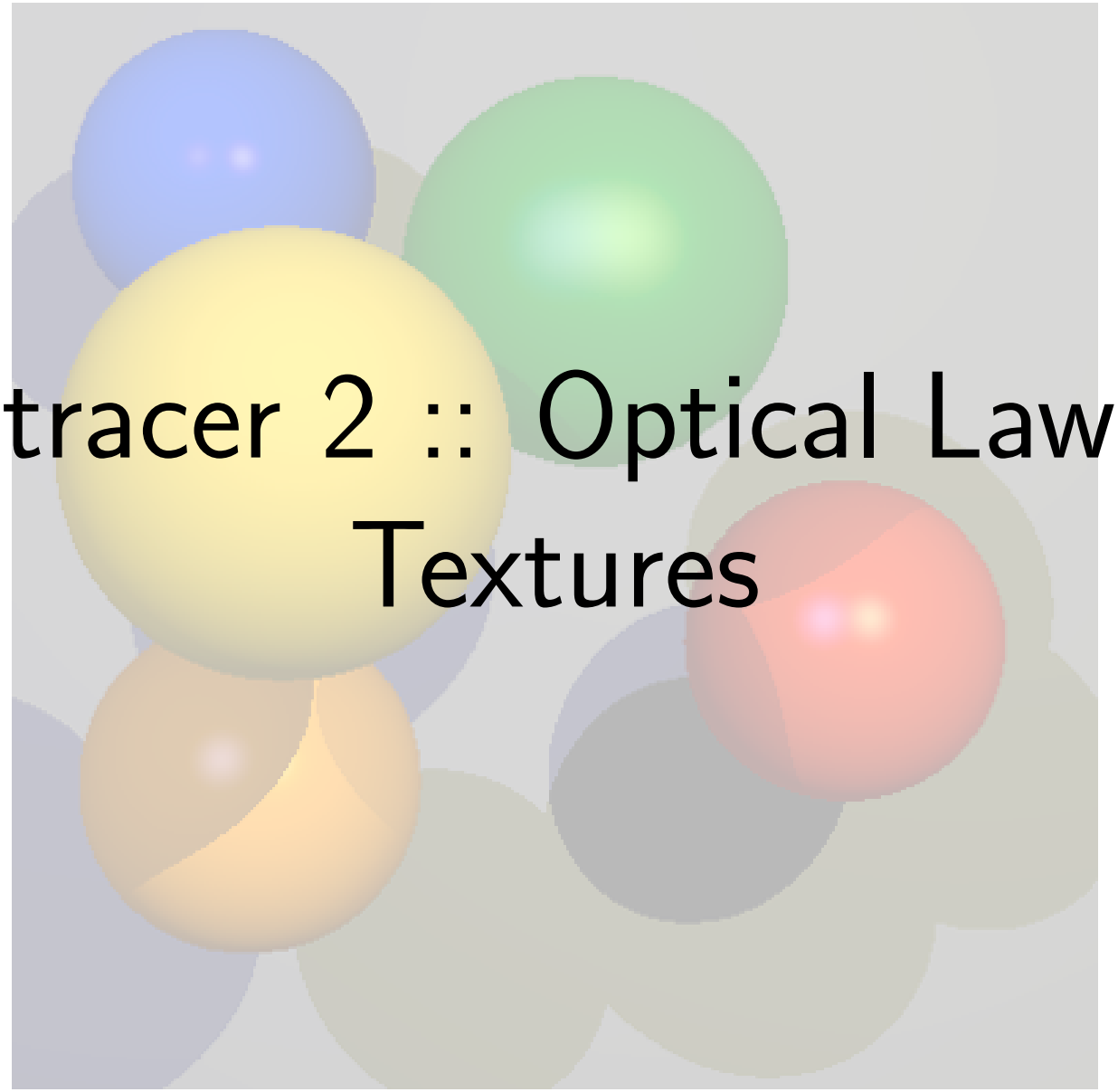
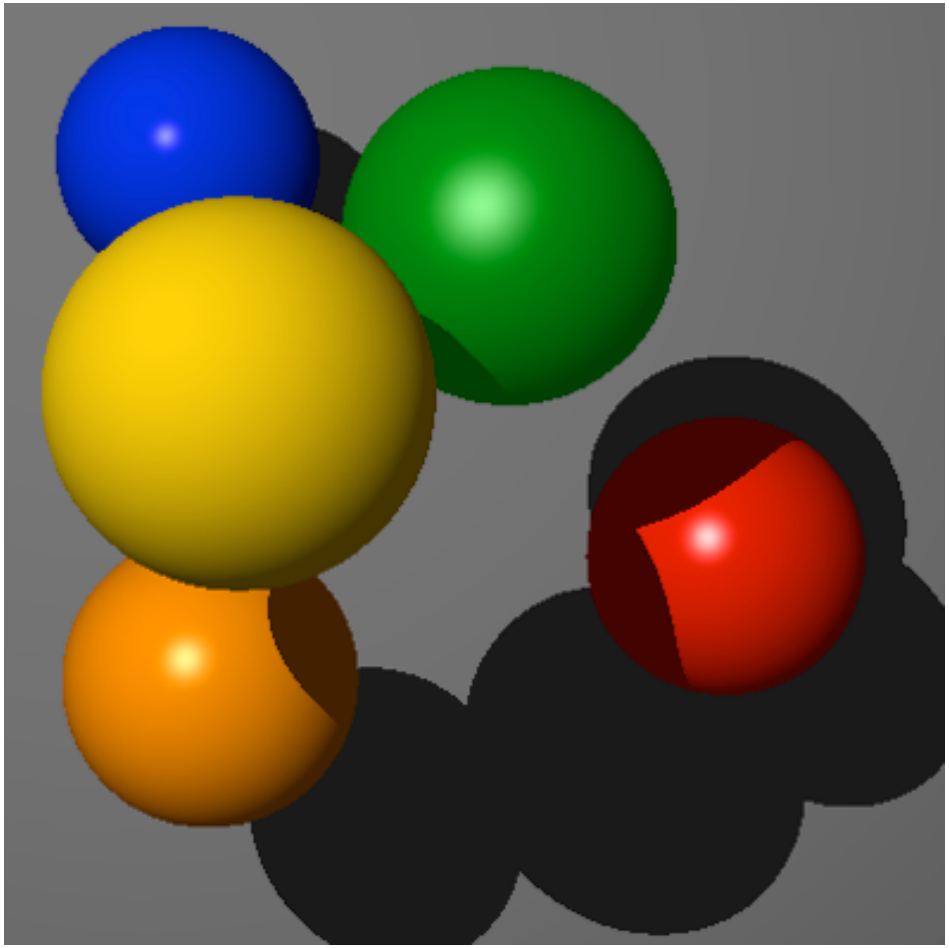


# Raytracer 2 :: Optical Laws & Textures

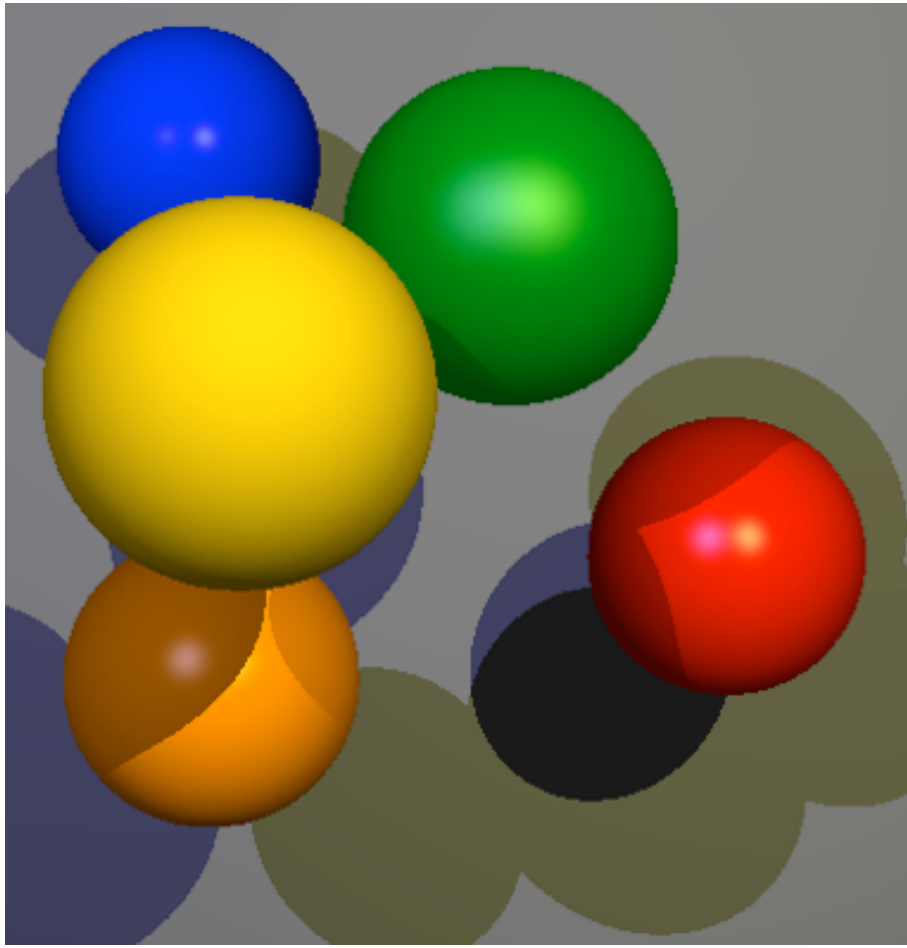
# Assignment

- Optical laws:
  - Shadows
  - Reflection
  - Refraction
- Camera:
  - Anti-aliasing (supersampling)
- Texture mapping for spheres:
  - Fixed texture
  - Rotated texture

# Shadows

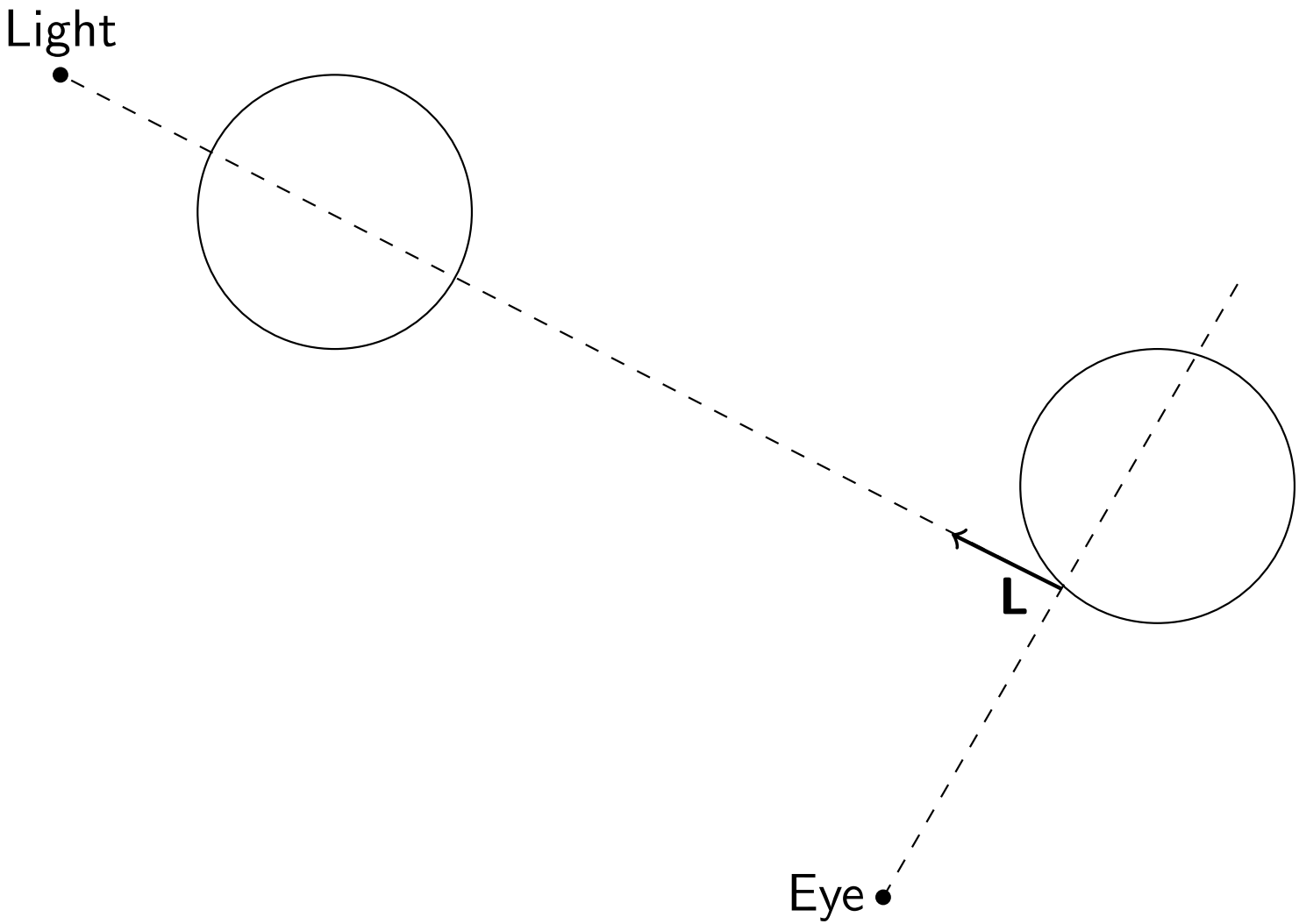


One light source

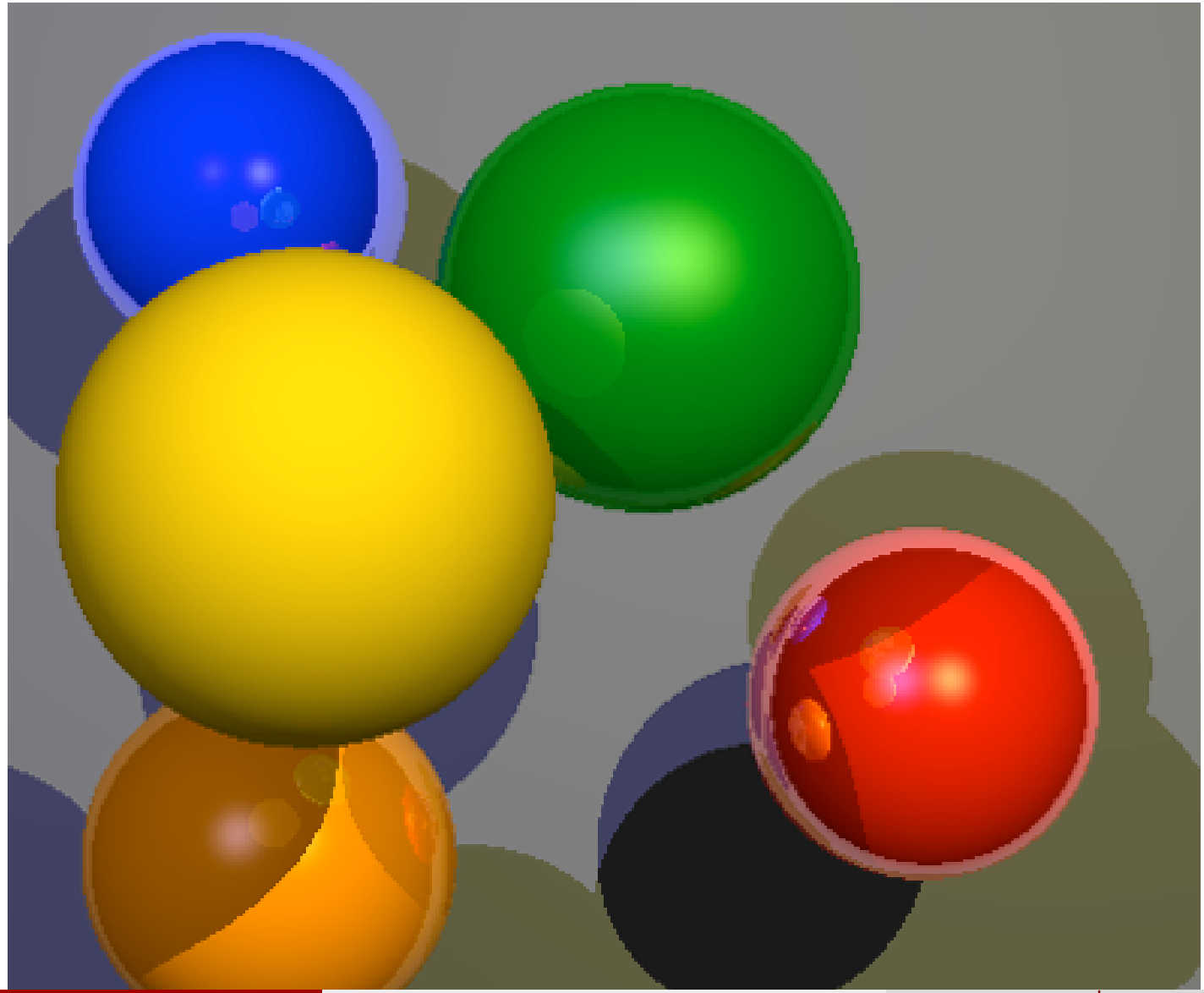


Two light sources

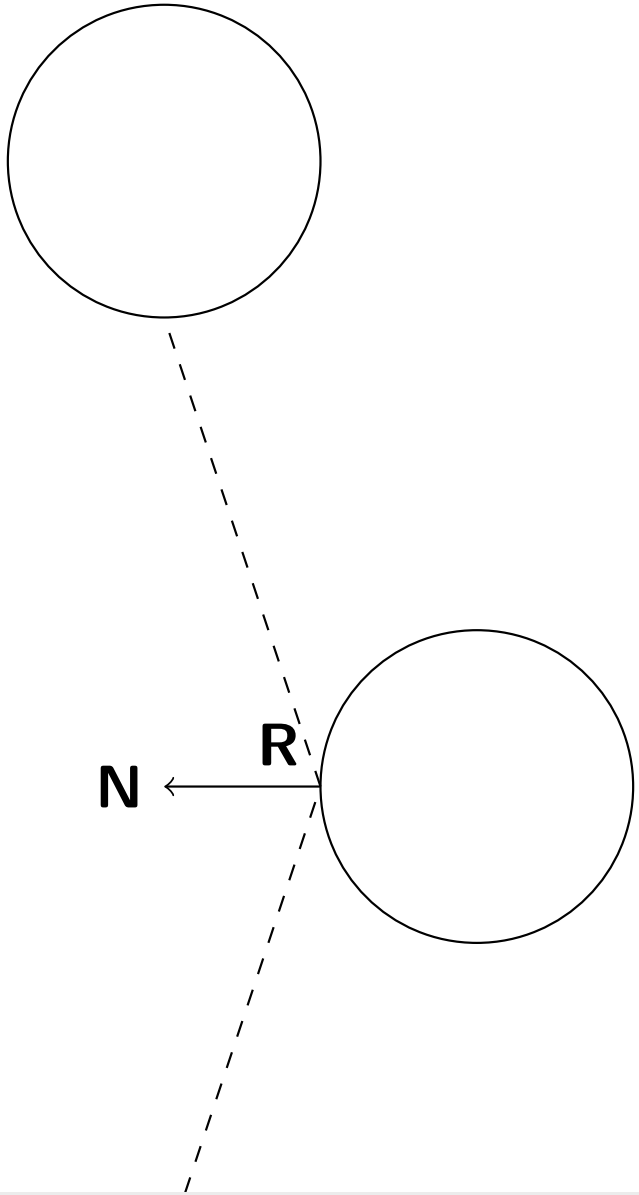
# Shadows: Basic idea



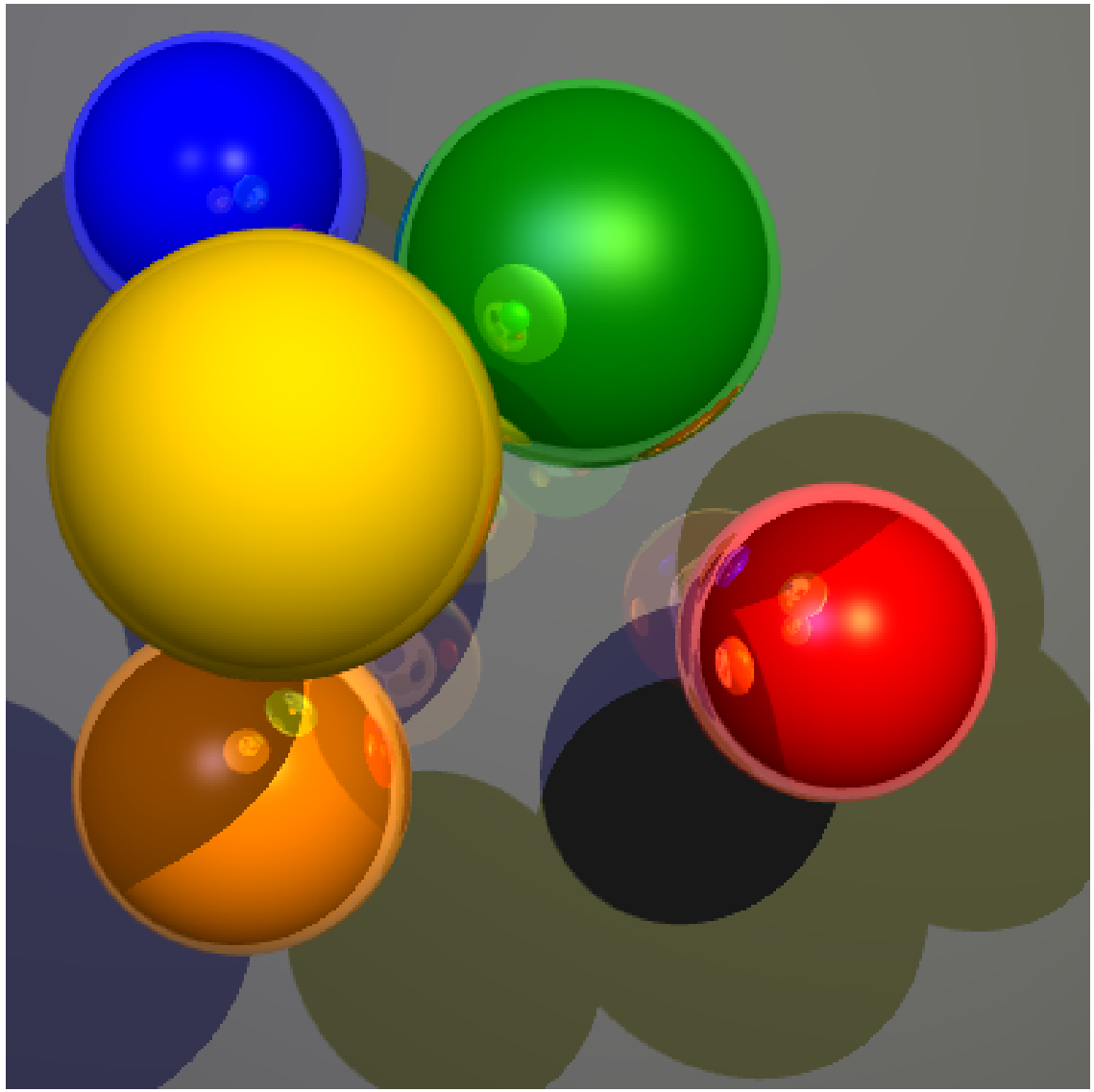
# Reflections



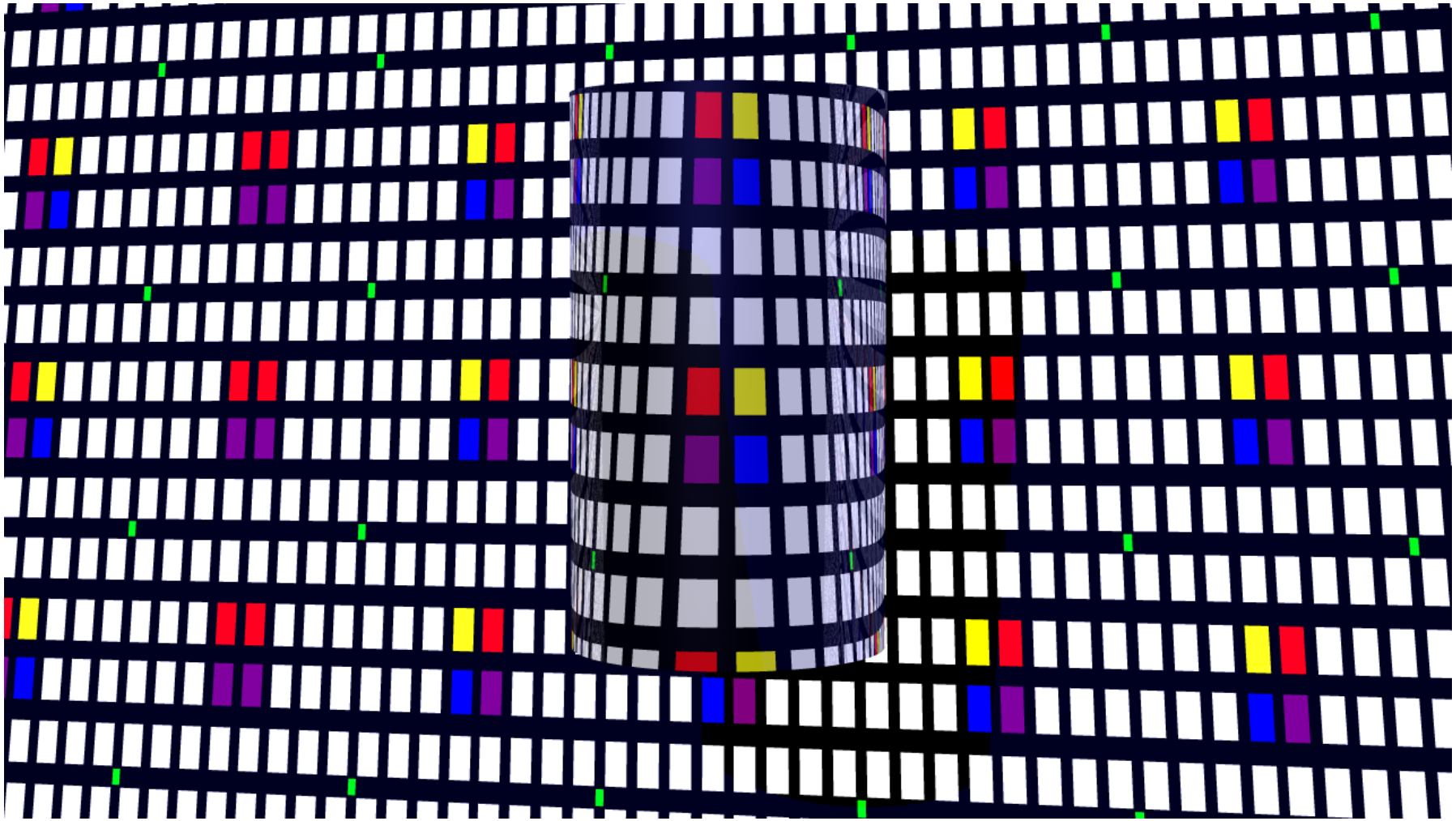
# Reflections: Recursively continue rays



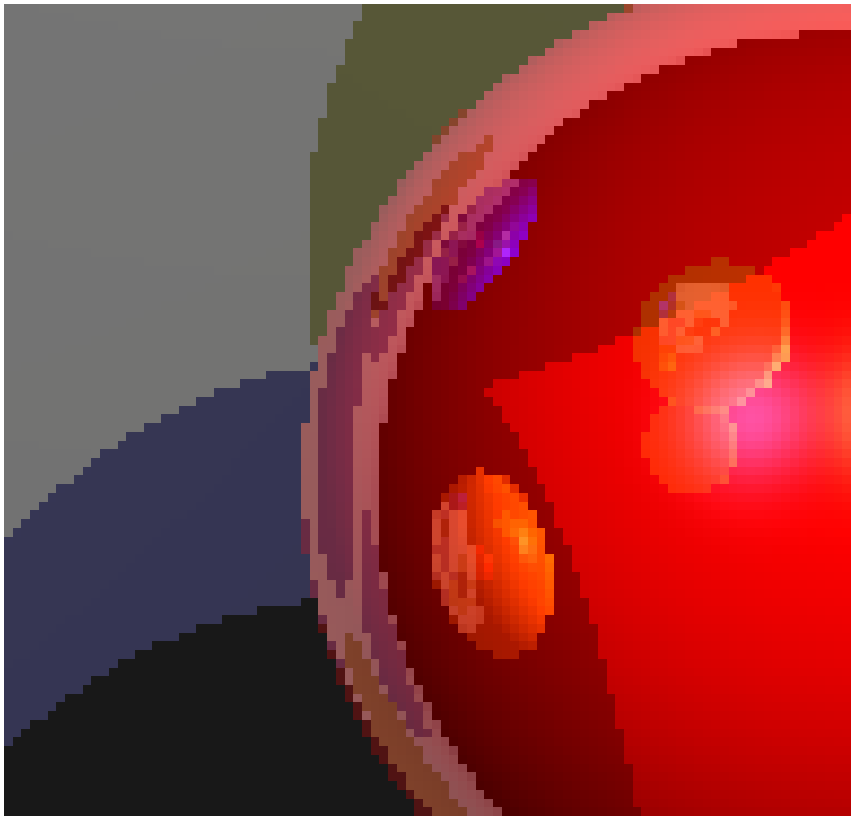
# Reflections



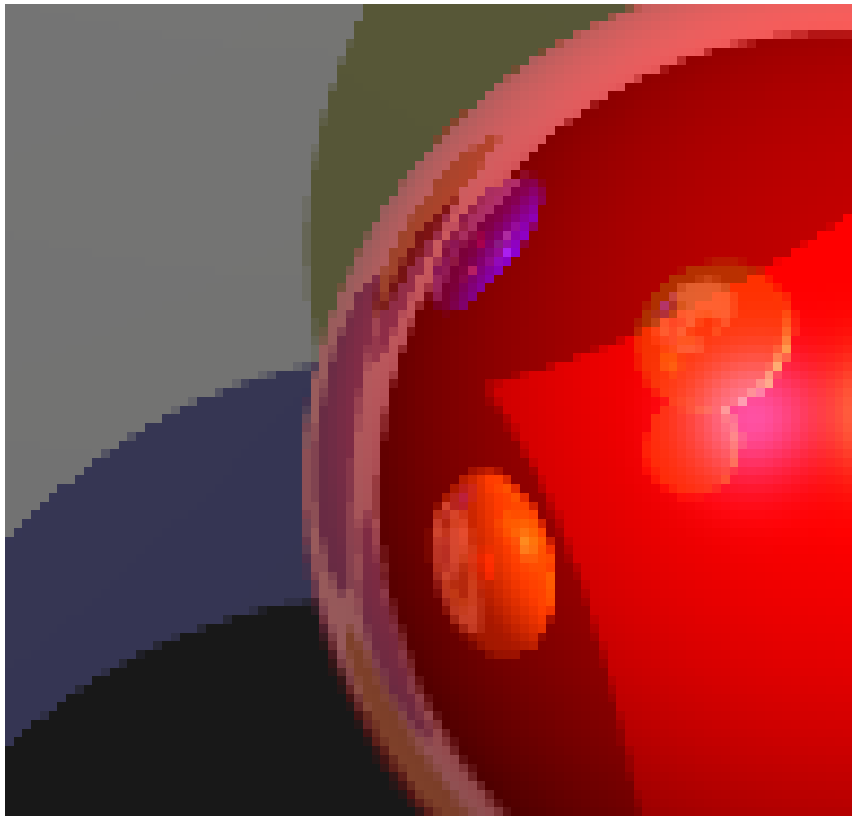
# Refraction



# Anti-Aliasing (AA)

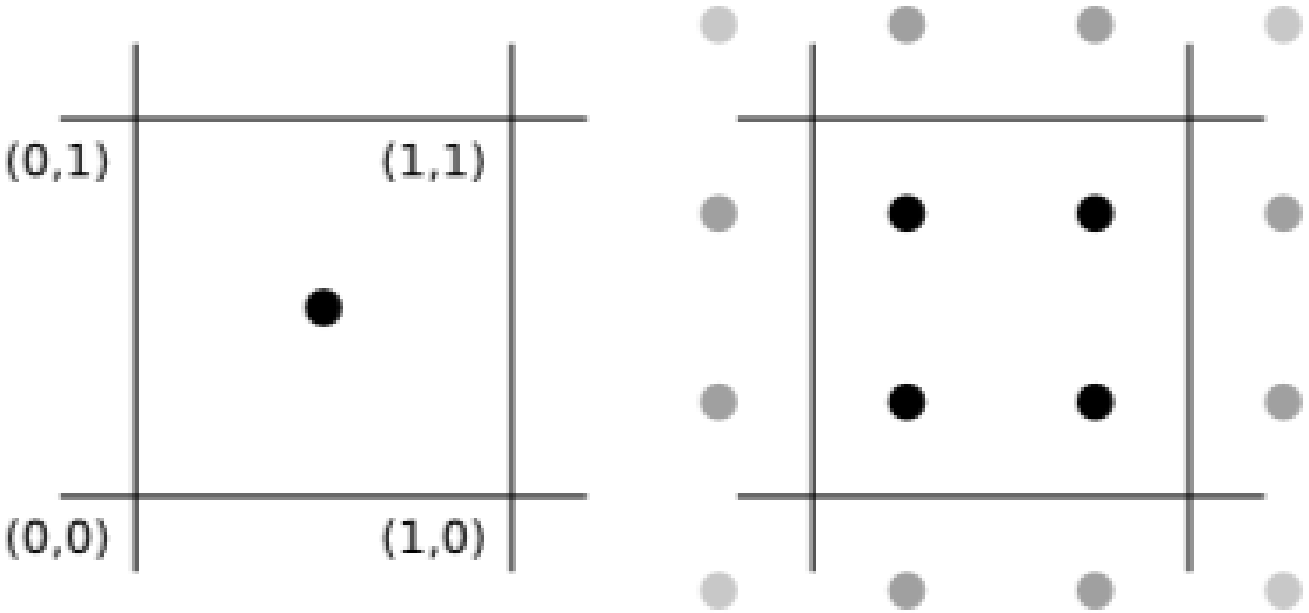


No Anti-aliasing



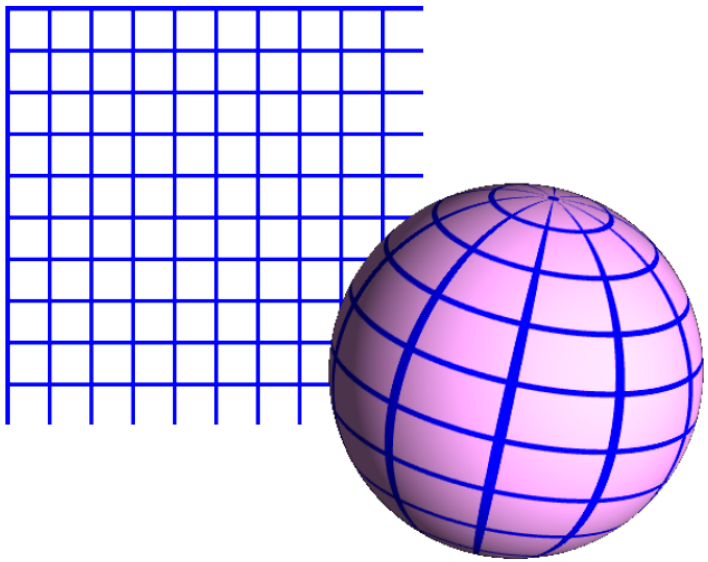
Anti-aliasing

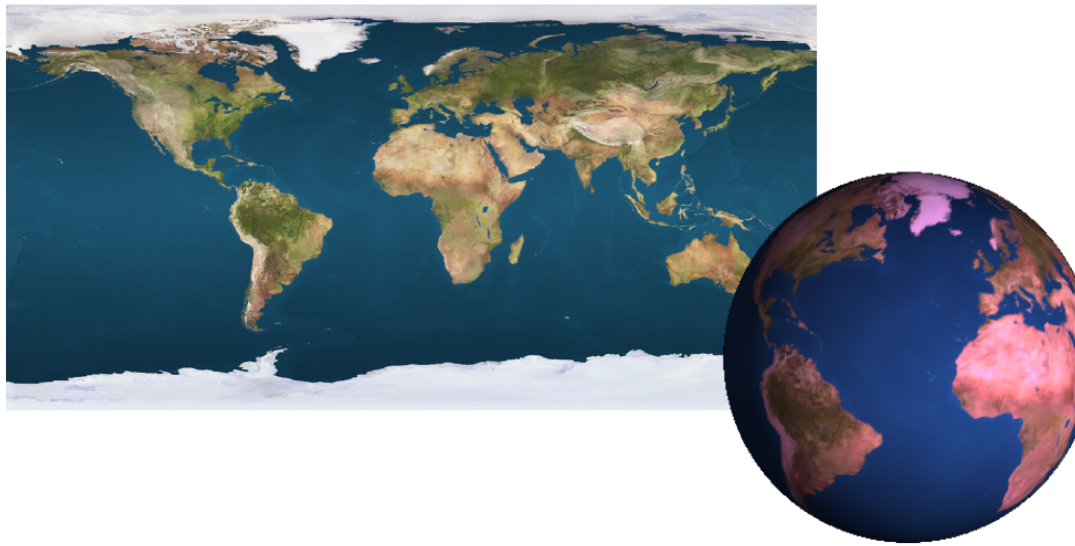
# Anti-Aliasing: supersampling (SSAA)




Average over multiple rays through a single pixel.

# Texture mapping





See the *Textures* lecture slides for the equations (slides 12-14).

Do not use the text book.

# Bonus: Rotations on a sphere

**Given:** a texture, an axis, and an angle.
**Task:** The sphere should be rotated angle degrees around this axis. The texture should follow this rotation.
There are several options for this:

- Quarternions
- Rotation matrix
- Spherical coordinates
- ...

# Bonus: Rotations of other objects

Do not try to rotate the object, but rather "rotate yourself around the object". Calculate intersections as if you were standing at the rotated view-point and looking towards the rotated ray-direction.