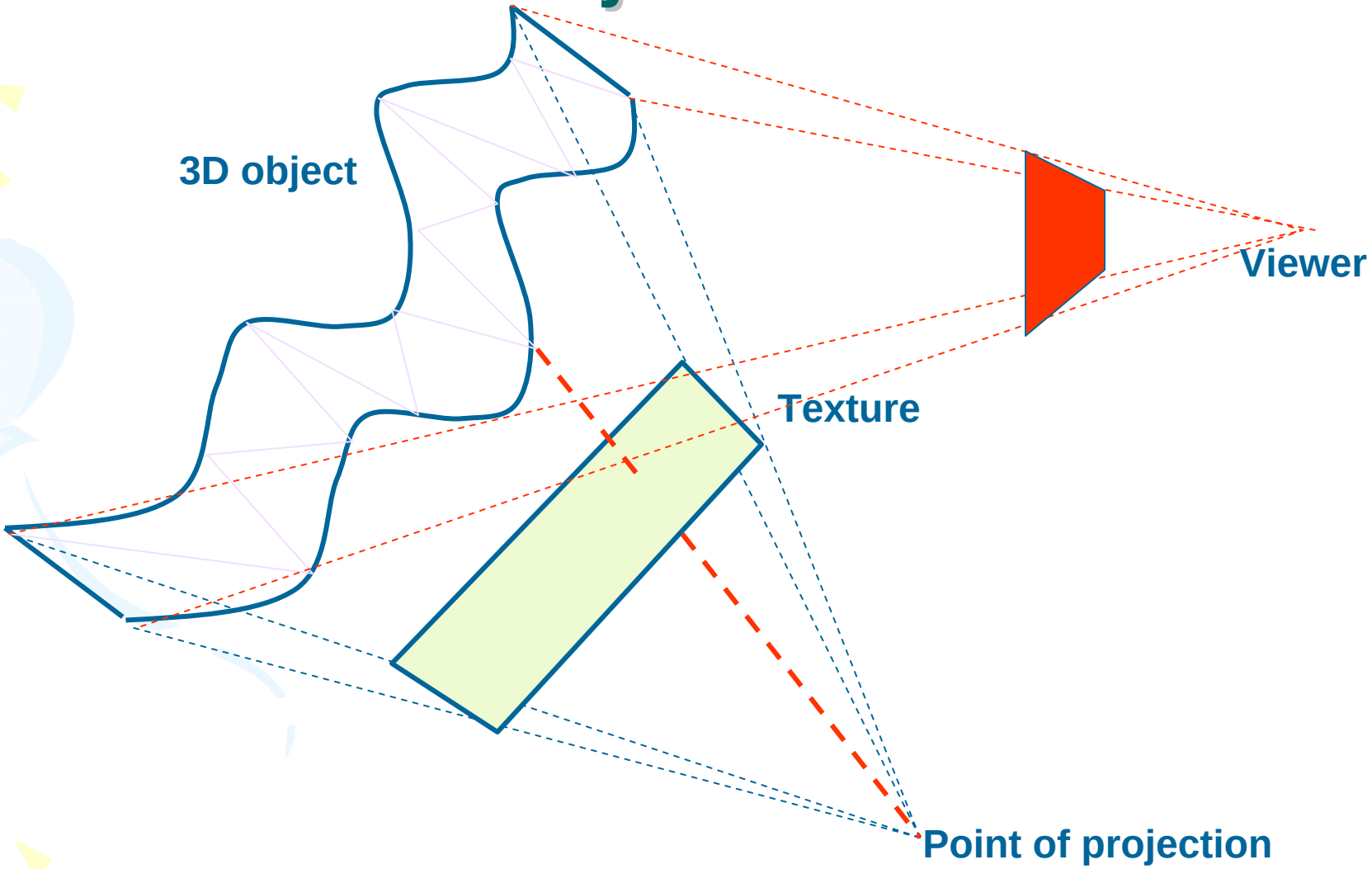
Projective Textures

CS 211A

Project a texture on 3D object

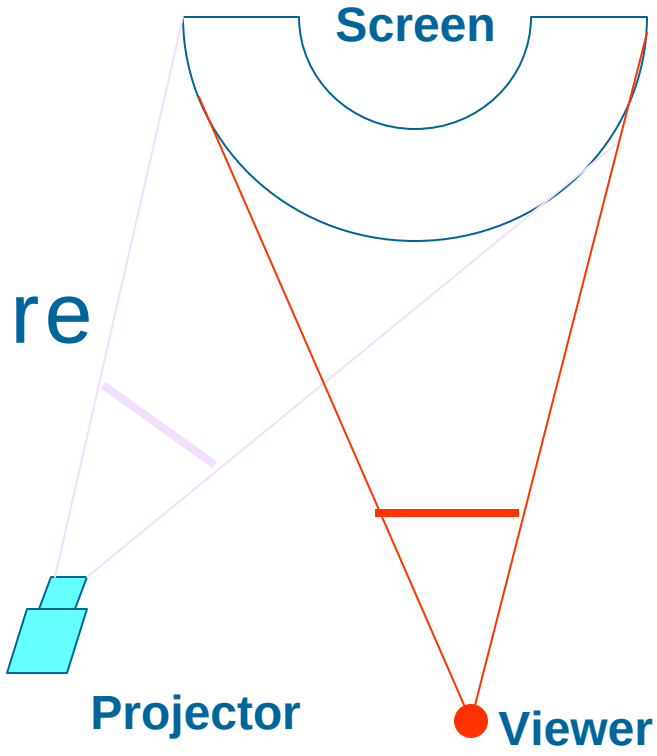


Multi-pass rendering

- More than one rendering passes
- Output of one pass is used in successive pass or passes
- Achieves several complicated effects
  - Non-planar VR environments
  - Shadows

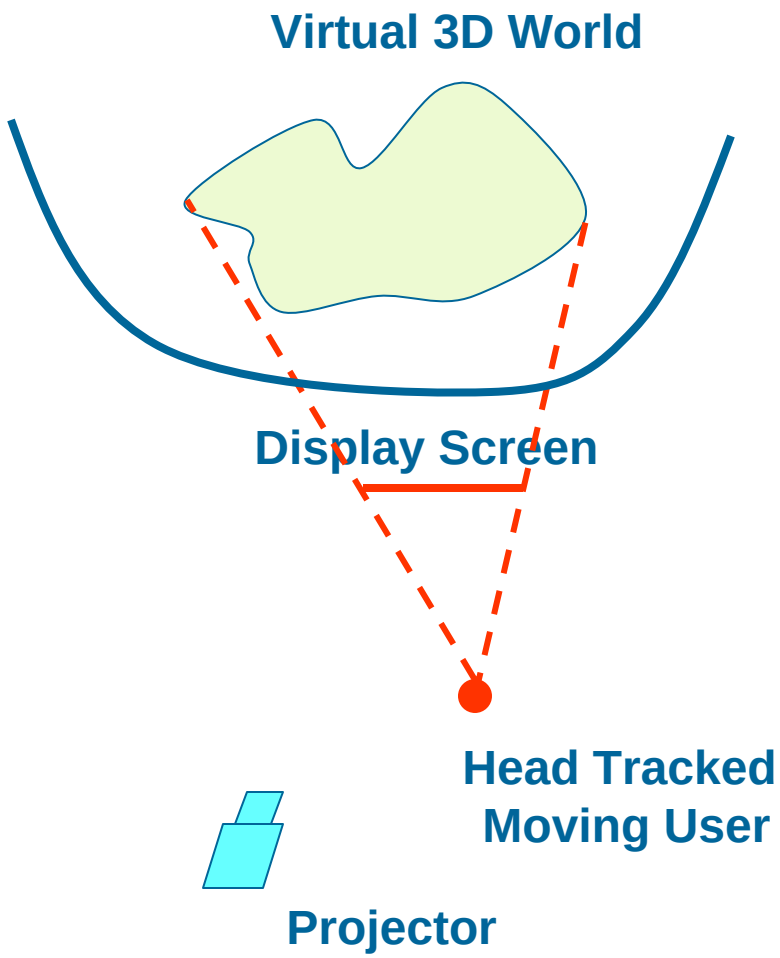
Designing Theatres

- Simulate what the viewer sees
- Texture map screen using projected texture from projector
- Render the screen from the viewer



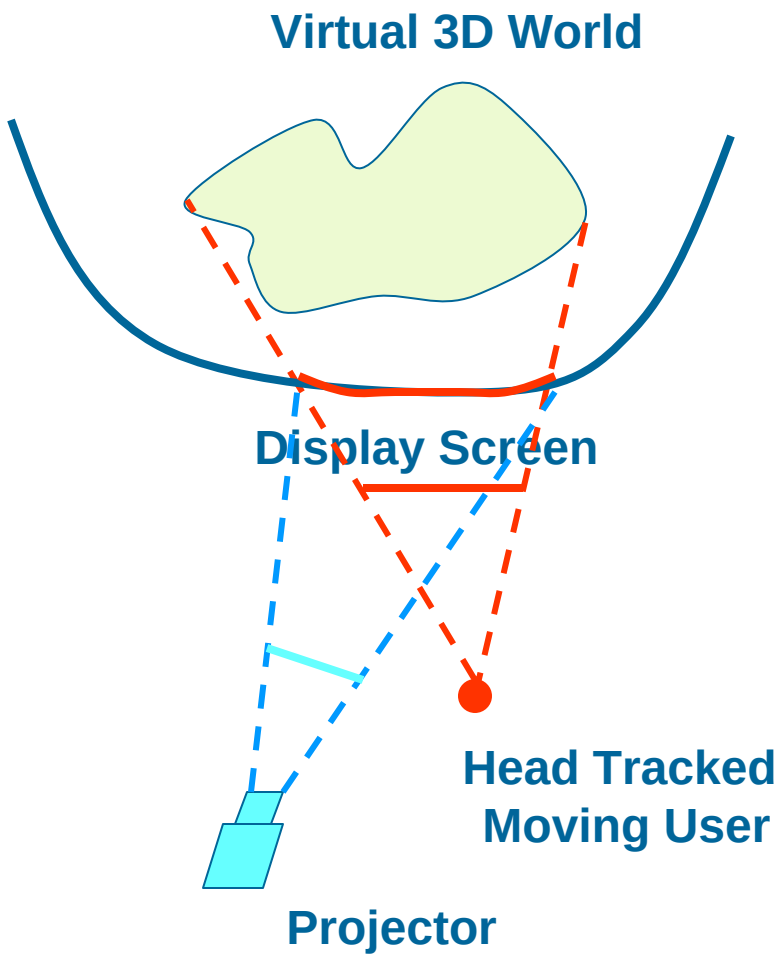
VR Environments

- Render the scene from user's viewpoint
- Distorted if projected from the projector location (since different from user)



How is it used?

- Use this rendered image as a projective texture
- Project it from the viewer on the 3D display screen
- Render this textured screen to generate the image of the projector

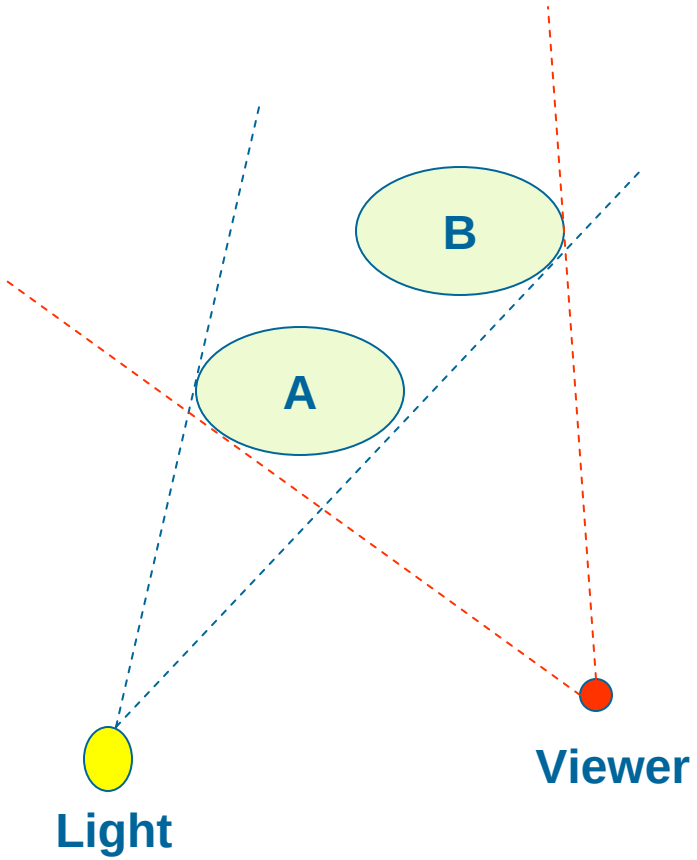


Shadows

- Points seen by viewer and NOT by light are in shadow
- Points seen by both viewer and light are lighted

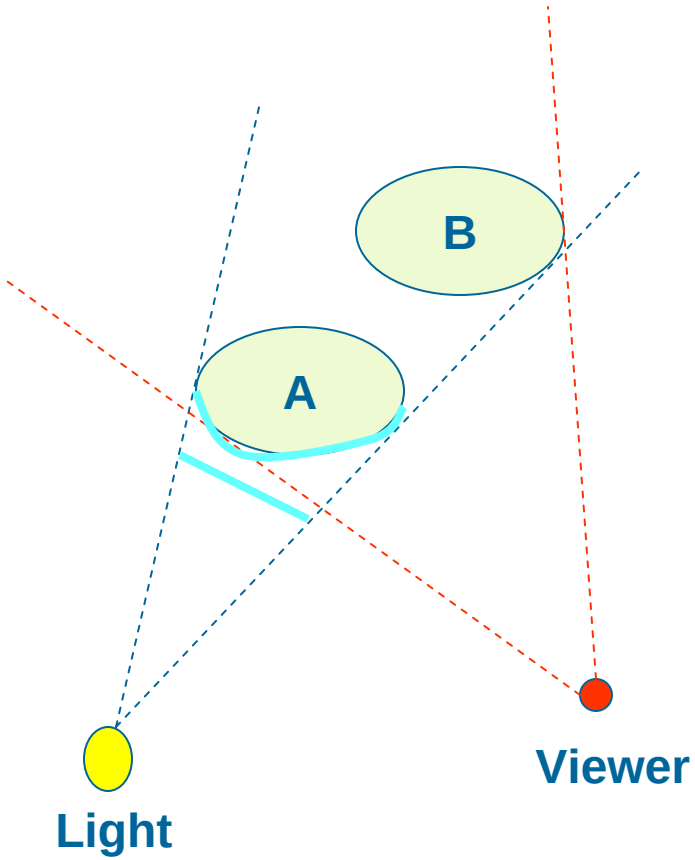
Shadows

- B is not getting light and hence in shadow
- B is seen by viewer as in shadow
- How to achieve the effect?



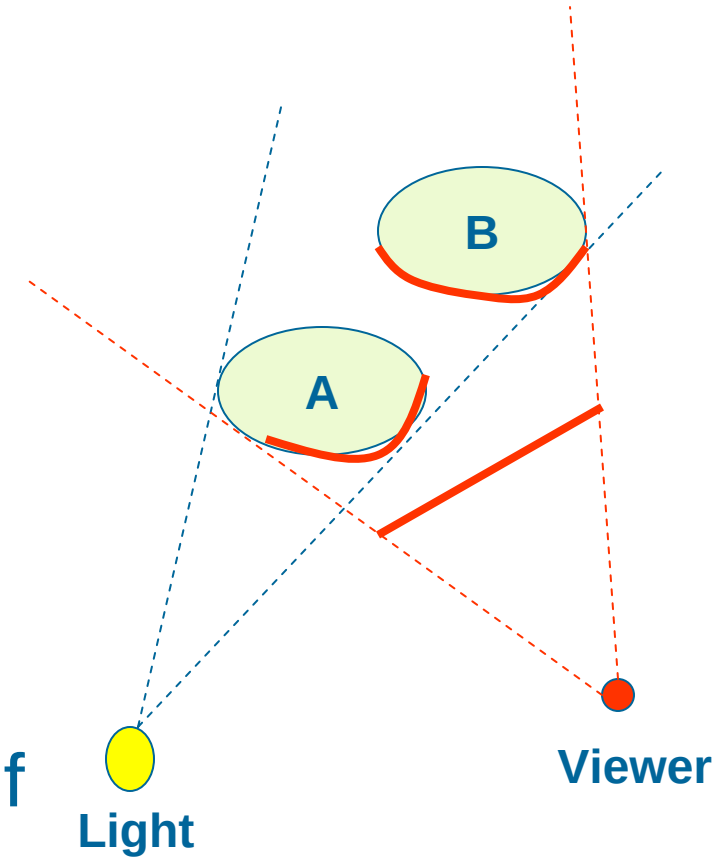
Rendering Pass 1

- Render the scene from light
- Z_L = The z-buffer gives the depth of the points that are lighted
- Save the z-buffer



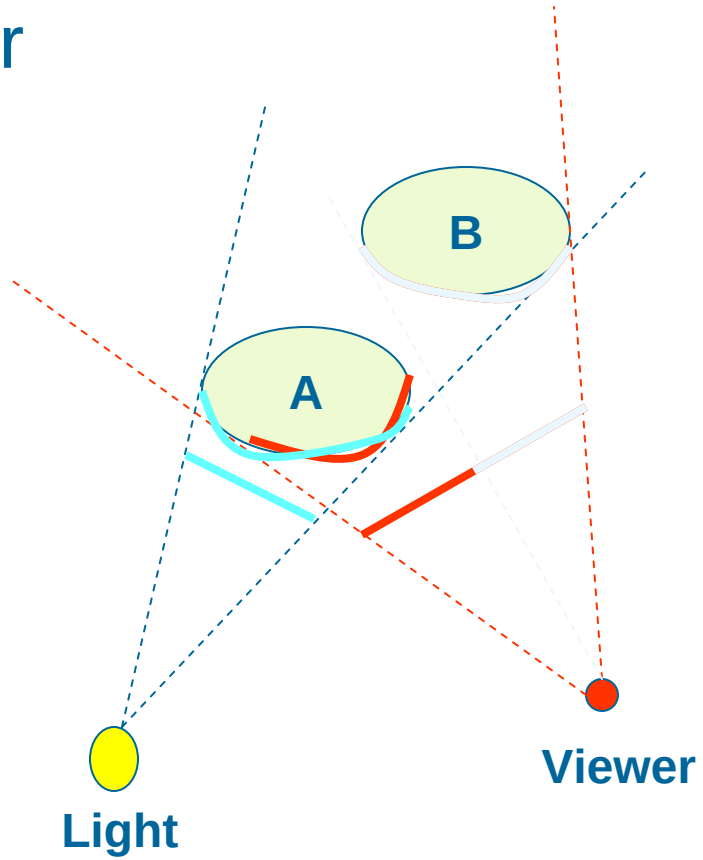
Rendering Pass 2

- Render the scene from the viewer
- Unproject them to get the 3D coordinates back
  - Finds all *visible* 3d points
  - Limits the number of 3D points to be considered



Rendering Pass 3

- Use the saved z-buffer from pass 1
- Use the visible 3D points from pass 2
  - Reproject them from light
- If the z of the visible points are more than the z in the saved buffer
  - In shadow
  - Attenuate them in the framebuffer for viewer



Results