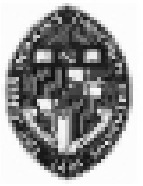
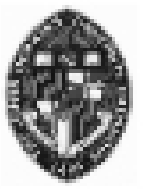


Accelerating Volume Rendering



Accelerating Volume Rendering

Ray casting

- Alpha-cutoff
- Space leaping

Splatting

- Hierarchical splatting
- Texture splats

Parallel algorithms

- Screen-space subdivision
- Object-space subdivision

3D texture mapping

- Transparent textures
- Shaded isosurfaces

Video

State et al., "Interactive Volume Visualization on a Heterogeneous Message-Passing Multicomputer," *Proceedings of the 1995 Symposium on Interactive 3D Graphics.*

Texture Splats

Uses texture hardware to apply contribution of each voxel to pixels

Precompute splat kernel texture

For each voxel plane (front-to-back)

For each voxel

Translate textured polygon

Set rgba according to voxel

Render textured polygon

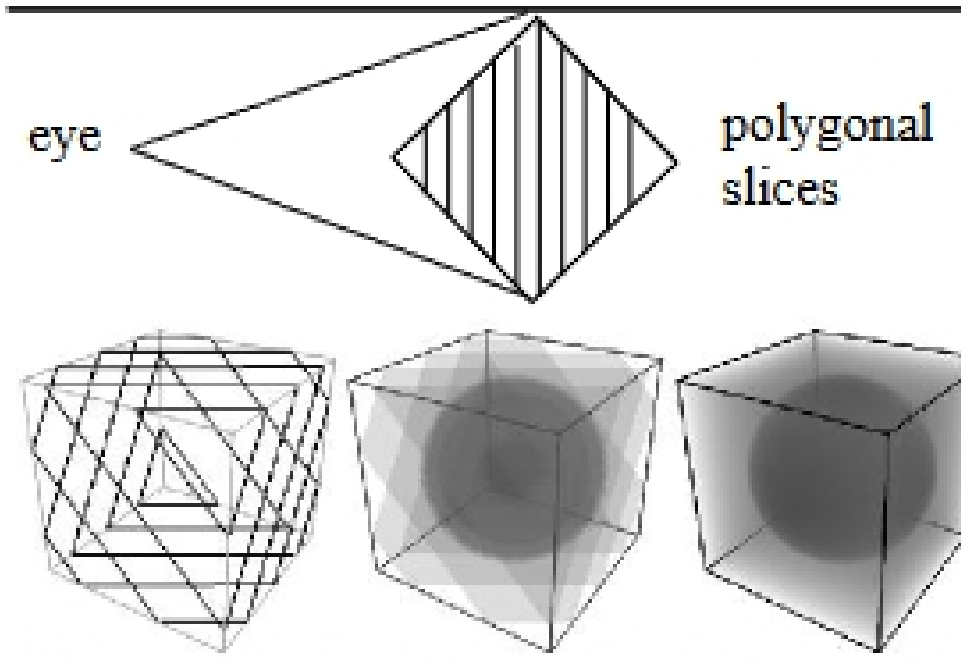
3D Texture Map Approach

Load volume data into 3D texture hardware

Generate set of slice polygons parallel to viewing plane

Render slices with 3D texture coordinates in front-to-back order

Transparent Textures Illustration



from Westermann and Ertl, "Efficiently Using Graphics Hardware in Volume Rendering Applications, *Proceedings of SIGGRAPH 98*, page 170.