Gaussian Splatting
Gaussian Splat Data Pre-processing

- X, Y, and Z - read as is
- Color - Converted to RGB values from spherical harmonics
  - Only using SH0 for diffuse for now
- Opacity - Logistic sigmoid
- Scale - Exponentiated
- Rotation - Normalized quaternion

Polycam uses y-axis down which requires further processing for position and rotation values.
# Splat to glTF Mapping

<table>
<thead>
<tr>
<th>Gaussian Splat Data</th>
<th>glTF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position</td>
<td>POSITION</td>
</tr>
<tr>
<td>Color (Diffuse, spherical harmonic 0)</td>
<td>COLOR_0 (RGB value of RGBA)</td>
</tr>
<tr>
<td>Opacity</td>
<td>COLOR_0 (A value of RGBA)</td>
</tr>
<tr>
<td>Rotation</td>
<td>_ROTATION</td>
</tr>
<tr>
<td>Scale</td>
<td>_SCALE</td>
</tr>
<tr>
<td>Specular (Spherical Harmonics 1-15)</td>
<td>Unused (Future work needed)</td>
</tr>
</tbody>
</table>
glTF Draft Extension

**KHR_gaussian_splatting**

```
"meshes": [{
  "primitives": [{
    "mode": 0,
    "attributes": {
      "POSITION": 0,
      "COLOR_0": 1,
      "_ROTATION": 2,
      "_SCALE": 3
    }
  }
  },
  "extensions": {"KHR_gaussian_splatting":{}}
}]
```

**Draft Extension Branch**
Splat Level of Detail in 3D Tiles
Voxels in glTF

Current State

3D Tiles

3DTILES_content_voxels

Future Work

glTF

EXT_primitive_voxels

Voxel data from Camptocamp, tiled as glTF, rendered in Unreal