

# The Shape of Space [1]

## Topology vs Geometry

**Topology of a surface:** the aspect of a surface's nature that is unaffected by deformation.

**Geometry of a surface:** consists of the properties that **DO** change when the surface is deformed.

**Geometrical properties:** curvature (most important), areas, distances, angles...

## Intrinsic vs Extrinsic Properties

**Intrinsic topology:** same intrinsic topology if inside the surface one cannot tell them apart.

**Extrinsic topology:** same extrinsic topology if one can be deformed within a higher-dimensional space to look like the other.

**Intrinsic geometry:** properties of the surface.

**Extrinsic geometry:** only to be appreciated from higher dimensions.

**Geodesic:** intrinsically straight line.

## References

[1] J. R. Weeks, *The shape of space*. CRC press, 2001.