Color of the particles

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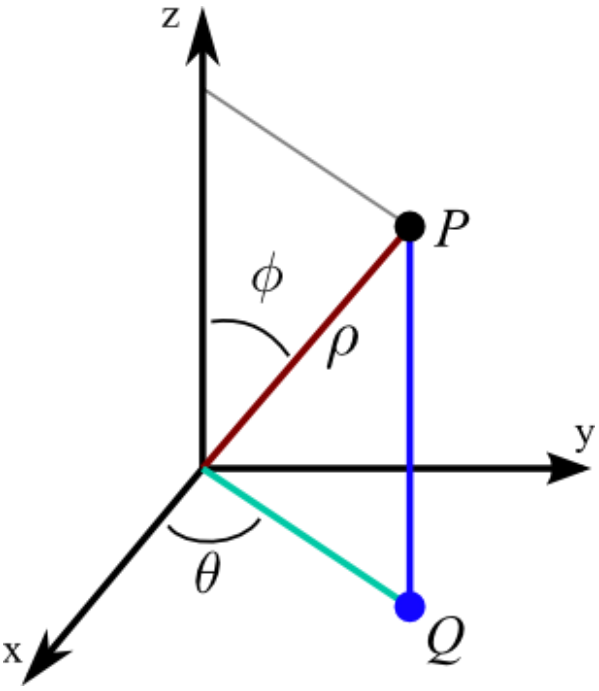
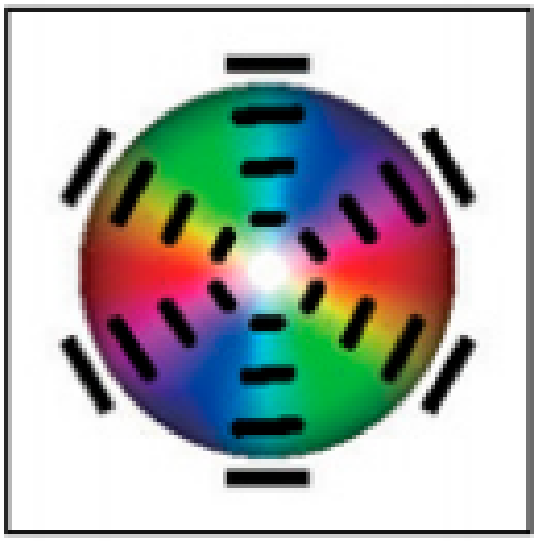
Tags	

Coloring ellipsoids' color by angle

Colors of the particles correspond to the scalar values in vtk file.

There are transfer functions that map scalar value(angle) to color and opacity.





calculate scalar value, angle of the particles (θ and ϕ)

$\theta = arctan(ny/nx)$

arctan is used as the colormap is symmetrical at y-axis. Only -90 to 90 degrees are needed.

$\phi = arccos(abs(nz))$

arccos(nz) tells the angle between z-axis and the long semi axis of the ellipsoid. Since the angle is symmetrical at x-y place, abs(nz) is used to find ϕ

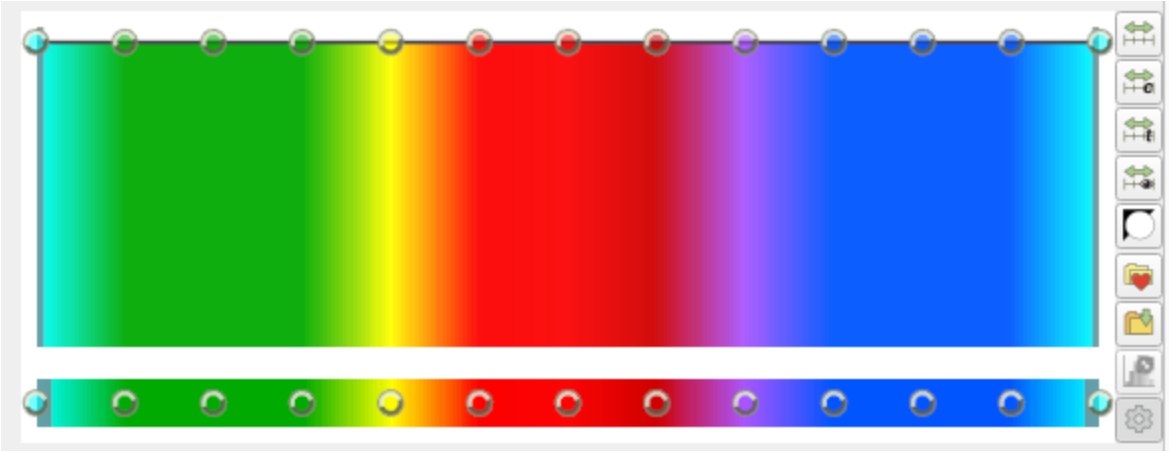
Optical model

For volume rendering, Paraview uses the popular “absorption plus emission model”.

$$I(a,b) = \int_a^b L(s)\tau(s)e^{-\int_a^s \tau(t)dt} + I_0 e^{-\int_a^b \tau(t)dt}$$

Control color bar in Paraview

You can manually adjust colorbar settings in Paraview. The color and opacity of the colorbar corresponds to the scalar value provided. In our case, it is either θ or ϕ.



More detail on colorbar can be found in the Paraview documentation

Adjust colorbar in python script

In visualiseVTK.py, you can see the transfer function for color(RGB, 0-1) and opacity(0-1).

The format is

```
thetaLUT.RGBPoints = [
      scalar value,
      R,
      G,
      B
]
```

```
e.g. red at -90 value, blue at -80
thetaLUT.RGBPoints = [
      -90,
      1.0,
      0,
      0,
      -80,
      0,
      1.0,
      0
]
```