First animation (50_deg.gif): cone angle=50 deg.

Second animation (80_deg.gif): cone angle=80 deg.

The white flecks in the animation files denote the regions where negative pulling force $F_z<0$ occurs. It can be seen that only in second animation (cone angle>60 degrees), there will be negative force regions (white flecks).

In both animations, the particle's relative permittivity is fixed at 3, and the permeability is changing as shown in the animation. The electric dimension of the particle is $k_0R=0.1$.

It is clear that if the cone angle is smaller than 60 degrees, the magnetodielectric sphere will not experience a pulling force. It is in good agreement with our derivation of universal necessary condition.