

1. The smallest angle you can resolve by eye is about  $10^{-3}$  radians.

The distance to the moon is about 400,000 km ( $4 \times 10^5$  km).

What is the diameter  $L$  of the smallest crater you could resolve by eye on the surface of the moon? Give your answer in km.

2. The smallest angle you can resolve with a ground-based telescope is about  $10^{-5}$  radians.

What is the diameter  $L$  of the smallest crater you could resolve with a telescope on the surface of the moon? Give your answer in km.

3. A golf ball has a diameter of about 4 cm, or 0.04 meters.

What is the angle  $\theta$  subtended by a golf ball at the distance of the moon?

Give your answer in radians. *Remember to convert the distance to the moon from km to meters.*

4. We think that there is a black hole of 4 million solar masses at the center of the Milky Way galaxy. The diameter of its event horizon would be 24 million km, which is about  $2.5 \times 10^{-6}$  light years.

The distance to the center of the galaxy is about 25,000 light years ( $2.5 \times 10^4$  light years).

What is the angle  $\theta$  subtended by the event horizon of the black hole at the center of the Milky Way? Give your answer in radians.