**Fig. 1** Moon Phase Angle

**Moon Phase Angle $\psi$**

$xy$-**axes** = fixed direction but moving frame centered on Earth

$x'y'$-**axes** = moving 'noon' frame centered on Earth (always points at Sun)

$x''y''$-**axes** = fixed frame of Sun

$\psi$ = moon phase angle = $\pi/2 + (\phi - \theta)$