Supplemental material description

PDF file *analysis_of_ellipses.pdf*:

Analysis of the ellipses in the phase space diagram for the billiard parameter Φ close to π.

Video 1 (available online at
https://www.physics.muni.cz/~tomtyc/spherical_wedge_billiard/video1.mp4):

Phase space diagram of the spherical wedge billiard for the parameter Φ (shown at the top) ranging from 0 to π in steps of $\pi/1000$. We used 1008 initial iteration points (ξ, ω), with 252 equidistant values of ω ranging from $-\pi/2$ to $\pi/2$ and 4 values of ξ, namely $-\pi/2$, 0, $\pi/2$ and π. For each initial point, 1500 iterations of the Poincaré map M are shown.

Video 2 (available online at
https://www.physics.muni.cz/~tomtyc/spherical_wedge_billiard/video2.mp4):

The disk trajectory segments with the corresponding points in the plane (ξ, ω) for $\Phi = 0.98\,\pi$. The initial iteration point marked by the red dot moves along the line $\xi = \pi/2$, the red arrow on the disk marks the corresponding initial line segment. 1500 iterations are shown.

Video 3 (available online at
https://www.physics.muni.cz/~tomtyc/spherical_wedge_billiard/video3.mp4):

Fixed points of the mapping M^q with different orders q up to 700 in the neighborhood of the point Γ in the coordinates (τ, η). As the billiard parameter Φ grows (the video shows it from $0.745\,\pi$ to $0.751\,\pi$), the points merge at the point Γ. The billiard parameter Φ along with the angle γ discussed in the text is shown at the bottom.