

Abstract Submitted
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Physics of badminton shuttlecocks. Part 1 : aerodynamics CAROLINE COHEN, BAPTISTE DARBOIS TEXIER, DAVID QUÉRÉ, CHRISTOPHE CLANET, LadHyX, Ecole Polytechnique — We study experimentally shuttlecocks dynamics. In this part we show that shuttlecock trajectory is highly different from classical parabola. When one takes into account the aerodynamic drag, the flight of the shuttlecock quickly curves downwards and almost reaches a vertical asymptote. We solve the equation of motion with gravity and drag at high Reynolds number and find an analytical expression of the reach. At high velocity, this reach does not depend on velocity anymore. Even if you develop your muscles you will not manage to launch the shuttlecock very far because of the “aerodynamic wall.” As a consequence you can predict the length of the field. We then discuss the extend of the aerodynamic wall to other projectiles like sports balls and its importance.

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