



**Fig. S1. Properties of pseudo-fixations and saccades.** (A) Speed of head saccades (average per saccade) plotted against the angular change of head orientation during a saccade. (B) Speed of head saccades while bees turn towards (black line) or away from (grey line, shaded) the nest. The head rotates faster when turning towards the nest than when turning away from the nest, as is the case for head speeds during pseudo-fixations (Fig. 3A). (Ci) In the course of a flight, the direction of head rotation and body rotation switches between CW and CCW. Transitions in which the direction of rotation is not clear (thick black line) constitute 24% of the total flight time and are not classified as fixations or saccades. (Cii) Plot of head orientation during example in Ci. Thick line marks transition between CW and CCW rotation. (D) Speed of the head relative to the body against body speed during transitions. As in Fig. 3C, the head moves in the opposite direction to the body and compensates partially for body speed (solid line is a linear fit with slope of  $-0.8 \pm 0.02$ ).