



**Figure 4.** The top panel shows the location of the bow shock (red) and the edge of the bullet (blue) as a function of time. Also shown are the positions of the mass centroids of the subcluster and the main cluster with solid lines (as labelled). In the bottom, the corresponding velocities are shown, obtained by numerical differentiation of the measured locations as a function of time. The time of core passage is marked with a dashed vertical line, while the time of the best fit of our simulation to the observed bullet cluster is marked with a dotted line.