Figure 5: Expected (open dots and $1\sigma$ and $2\sigma$ bands) and observed (full dots) cross-section times branching fraction upper limits (95% CL) for the processes indicated in the bottom left corner of each plot. $\tau_{\text{LLP}}$ is always 10 ps. The results correspond to the 8 TeV dataset. a) upper limits as a function of the LLP mass for process $PA$; b) as a function of the LLP mass for process $PB$, with $m_{\tilde{q}} = 100\text{ GeV}/c^2$; c) as a function of $m_{h^0}$ for process $PC$ for $m_{\text{LLP}}$ of 20, 40, and 60 GeV/$c^2$, from top to bottom (the single point at 130 GeV/$c^2$ with $m_{\text{LLP}} = 60\text{ GeV}/c^2$ has been shifted to the right for visualisation); d) upper limits as a function of the LLP mass for process $PD$ with $m_{\tilde{q}} = 60\text{ GeV}/c^2$.

assuming four LLP production mechanisms with the topologies shown in Fig. 1, covering LLP lifetimes from 5 ps up to 100 ps and masses in the range 20–80 GeV/$c^2$. One of the processes proceeds via the decay of a Higgs-like particle into two LLPs: the mass of the Higgs-like particle is varied between 50 GeV/$c^2$ and 130 GeV/$c^2$, comprising the mass of the scalar boson discovered by the ATLAS and CMS experiments. In addition, the full set of neutralino production mechanisms available in PYTHIA in the context of MSSM/mSUGRA has been considered, with an LLP mass range 23–198 GeV/$c^2$. The results for all theoretical models considered are compatible with the background-only hypothesis. Upper limits at 95% CL are set on the cross-section times branching fractions.