

This document summarizes the main points of the discussion at the workshop.

- Are there ATLAS or CMS studies for discovering light $SU(2)$ triplet fermions in the context of the see-saw III model? Possible decays are $\Sigma^- \rightarrow lZ, \nu W^-$, $\Sigma^0 \rightarrow \nu Z, l^\pm W^\mp$. Smallness of Yukawas imply most likely displaced vertices, see also below.
- Assuming one does find edge structures in the di-lepton spectra, e.g. in cascade decays of new particles: to which extent is it possible to say at the 5σ level that different kinematics are needed for the e^+e^- spectrum compared to the $\mu^-\mu^+$ spectrum?
- How well can one measure the heights of the endpoints of the $l_i^\pm l_j^\mp$ spectra versus the heights of the endpoints of the $l_i^+ l_i^-$ spectra, e.g. $\text{BR}(e^\pm \mu^\mp) / \text{BR}(\mu^+ \mu^-)$.

Example processes for both items are cascade decays containing the chain $\tilde{\chi}_2^0 \rightarrow l_i^\pm l_j^\mp \tilde{\chi}_1^0$.

- How well can one measure two same-sign leptons together with n -jets? Example processes for the 3rd item are $d\bar{u} \rightarrow \tilde{e}_L \rightarrow e^- \tilde{\chi}_1^0 \rightarrow e^- e^- + 2 \text{ jets}$ (SUSY with R -parity violation¹) or production of a doubly charged Higgs boson via vector-boson fusion: $dd \rightarrow uuW^-W^- \rightarrow uuH^{--}$
- How well can one measure the finite decay length of a heavy particle? Examples are $\tilde{\chi}_1^0$ in R -parity violating SUSY, or light $SU(2)$ -triplet fermions in the context of the see-saw III model², or ν_R in inverse see-saw models.

In case of R -parity violating SUSY with a neutralino LSP: which of the following final states are most useful in this context: $l^+ l^- \nu$, $l^\pm jj$, $jj\nu$, $bb\nu$ where j denotes a jet from quarks of the first two generations. If a GMSB model is realized one has in addition $\gamma\tilde{G}$ or in AMSB one has in addition chargino decays into $3l$, ljj , lbb , $jj\nu$, $l\nu\nu$.

- To which extent one can transfer strategies for $\tau^- \rightarrow \mu^- \mu^- \mu^+$ to flavour violating decays of heavy particles, e.g. $\tilde{\chi}_1^- \rightarrow \mu^- \mu^- \mu^+$.

¹There is an on-going ATLAS study for resonant sneutrino production $d\bar{d} \rightarrow \tilde{\nu}_\tau \rightarrow e^\pm \mu^\mp, d\bar{d}$.

²Has at least partly been discussed in arXiv:0901.1264 (hep-ph)