Motivation

- Heavy quarks (charm and beauty) are strongly interacting with hot & dense QCD matter produced in Pb-Pb collisions
- Strong suppression of heavy quarks production ($R_{AA} < 1$)
- In-medium energy loss of heavy quarks in the QCD medium
- Positive elliptic flow of particles from heavy-flavour hadron decays ($v_2 > 0$)
- Heavy quarks participate to collective motion
- Observed positive $v_2$ of particles from heavy-flavour hadron decays in small system (p-Pb collisions)
- Indicate final state effects in small system?
- Modification of heavy-quark production ($R_{pPb}$) not observed so far

Heavy-flavour jet measurement with electrons

- Idea: use electrons from heavy-flavour hadron decays ($e \rightarrow HF$) to identify jets originally from charm and beauty quarks
- Reconstruct charged-particle jets (FastJet algorithm, Anti-$k_t$)
- Find electrons from open heavy-flavour hadron decays in reconstructed jets
- Momentum matching between electron and track in the reconstructed jets
- Subtract jets containing photonic electrons and hadrons, and get jets containing electrons from heavy-flavour hadron decays ($e_\gamma$-jet)
- $e_\gamma$-jet measured with $R_{pPb}$:
  $$n_{e_\gamma} = \left[ n_{e_\gamma}^{\text{cont}}(p_T) - \left( \frac{1}{V} \right) n_{e_\gamma}^{\text{had}}(p_T) - n_{e_\gamma}^{\text{pho}}(p_T) \right] d\Sigma$$
- $R_{pPb}$: photonic electron reconstruction efficiency
- Reconstruction efficiency, unfold $p_T$ spectrum for detector response and background fluctuations

Summary

- Measured jets containing electrons from heavy-flavour hadron decays in pp & p-Pb
  - with various jet resolution parameters; $R=0.3$, 0.4 and 0.6
  - Consistent with a pQCD calculation (POWHEG+PYTHIA) for jets from charm and beauty in pp collisions
  - $R_{pPb}$ of $e_\gamma$-jet measured with $R=0.3$, 0.4 and 0.6 is equal to unity
  - $\sigma_{R=0.3}/\sigma_{R=0.6}$ of $e_\gamma$-jet are similar in pp and p-Pb within uncertainties
  - reproduced by pQCD calculations
- Indicates there is no evidence for final state effect (energy loss) on heavy-flavour productions in small systems