Homework 25.06.2021:

A) The nuclear modification factor is defined as: $R_{AA} = \frac{\frac{dN^{AA}}{dp_T}}{< T_{AA} > \frac{dN^{pp}}{dp_T}}$

Assume that the shape of the pp spectrum has the form: $\frac{1}{p_T}\frac{dN}{dp_T} = C\frac{1}{p_T^n}$ with n = 8

There should be a constant fractional energy loss with p_T: $p_T^{'} = (1-\epsilon)p_T$

Calculate analytically R_{AA} and then for an R_{AA} of 0.25 the energy loss ε.

B) Use the same data NTuple as for the flow calculation. Download the new program "Jet.cc". Write with the provided hints a simple jets finder. Plot the jet spectrum.

C) In B) a simple jet finder should be written which is clustering all track with a cone radius of $R = \sqrt{\Delta\phi^2 + \Delta\eta^2} < 0.3$ around a high p_T track. Even without doing B), discuss what is problematic with that approach in heavy-ion collisions. What is missing to get to a "true" jet spectrum?