

B.-A. Li, X. Han, Physics Letters B 727 (2013) 276–281

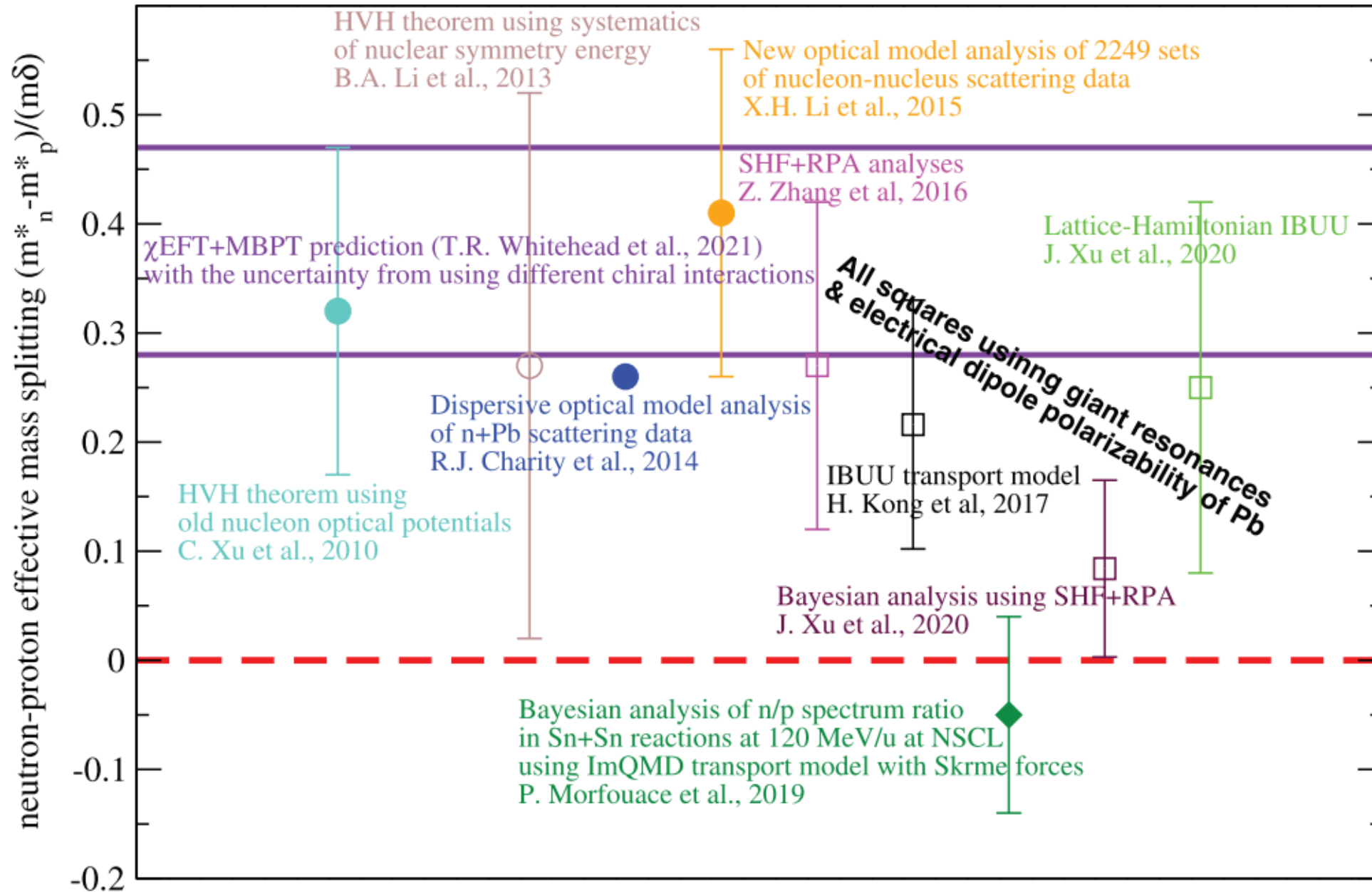
$$E_{\text{sym}}(\rho) = \frac{1}{3} \frac{\hbar^2 k_F^2}{2m_0^*} + \frac{1}{2} U_{\text{sym}}(\rho, k_F),$$

$$L(\rho) = \frac{2}{3} \frac{\hbar^2 k_F^2}{2m_0^*} + \frac{3}{2} U_{\text{sym}}(\rho, k_F) + \left. \frac{\partial U_{\text{sym}}}{\partial k} \right|_{k_F}$$

(HVH) theorem

After some math and physics

$$m_{n-p}^*(\rho_0, \delta) \approx \delta \cdot \left[3E_{\text{sym}}(\rho_0) - L(\rho_0) - \frac{1}{3} \frac{m}{m_0^*} E_F(\rho_0) \right] / [E_F(\rho_0) \cdot (m/m_0^*)^2].$$



Towards a new proposal? Part of it together with LGPT?

From the available data in literature (to our knowledge), two measurements performed with heavy ion collisions are pointing towards $m_n^* < m_p^*$.

This is somehow strange and would deserve a further investigation: in particular we do not expect to be able to provide a new precise measurement of about Δm_{np} , but we could try to validate (or not) it with an independent and clean analysis with HIC

F. Gulminelli support this quest:

- One of the main problems of the latest analysis is that Morfouace and Tsang changed both at the same time the Equation of State and the isoscalar and isovector mass -> this could lead to "strange" correlations
- A clean approach would it be to find a region and observables where we are mainly sensitive to effective masses and less to the symmetry energy

Questions:

- Is this region exist? High Pt regions?
- Are any observables at GANIL energies? Flow (if any) ... but we can exploit in any case the INDRA FAZIA Coverage -> Reaction plane!
- If yes, but we do not detect neutron. Francesca suggested that the neutron effective masses can be deduced as a difference from the proton and deuteron effective masses.
- A. Ono raised an important point: clusterization processes within the model may play a crucial role since we aim at deuterons

Let's go heavy...or at least heavier

The idea could be to perform an experiment between an heavy guy and a "lighter" partner to profit by the inverse kinematic and the FAZIA and INDRA mass id.

Some candidates (that allow, in case, also to scan a large N/Z in both projectile and target) – not all of them

- $^{136,124}\text{Xe} + ^{64,58}\text{Ni}$ @ 35 or 50 MeV/u
- $^{136,124}\text{Xe} + ^{100,92}\text{Mo}$ @ 35 or 50 MeV/u

Balance energy at 40 MeV/u??

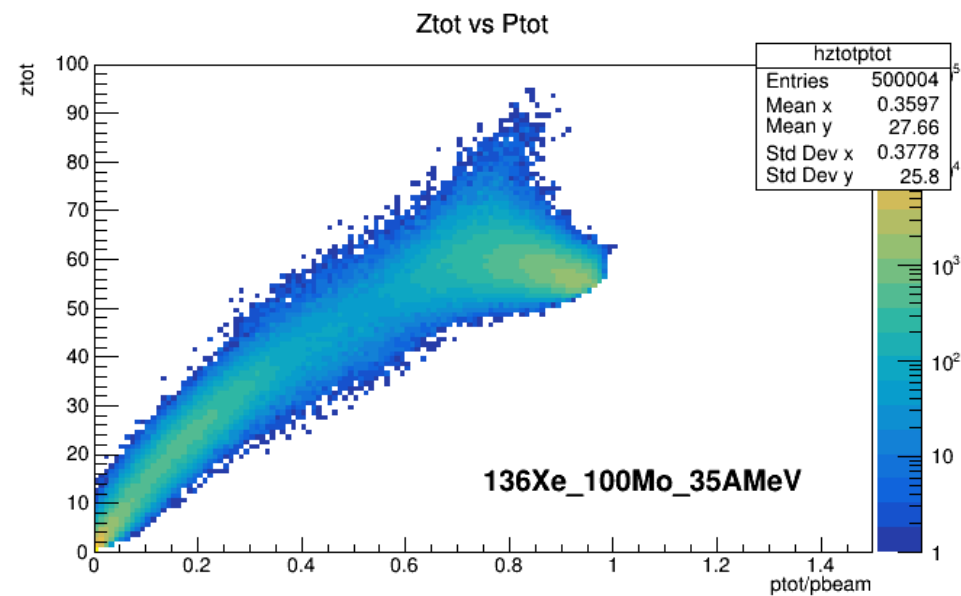
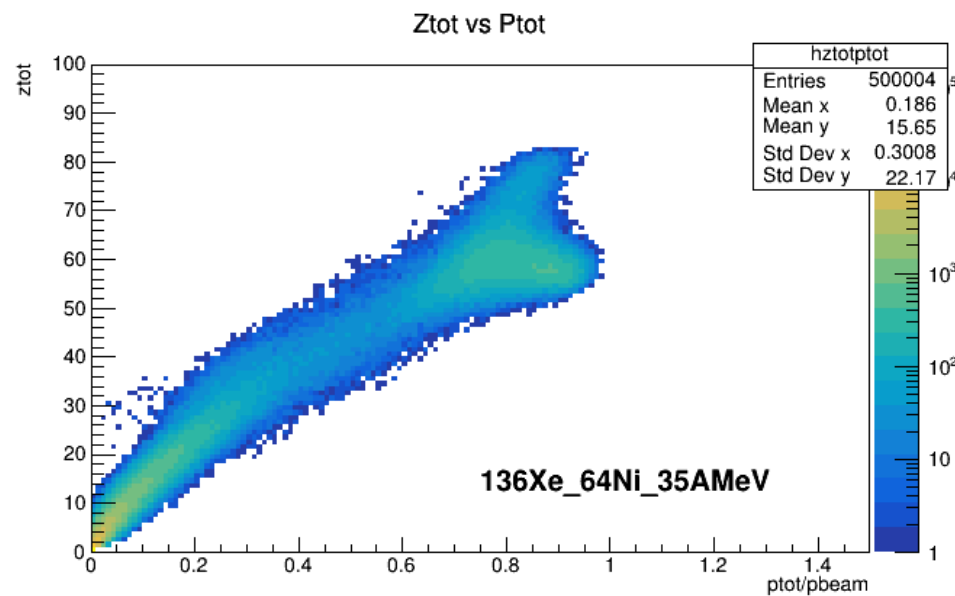
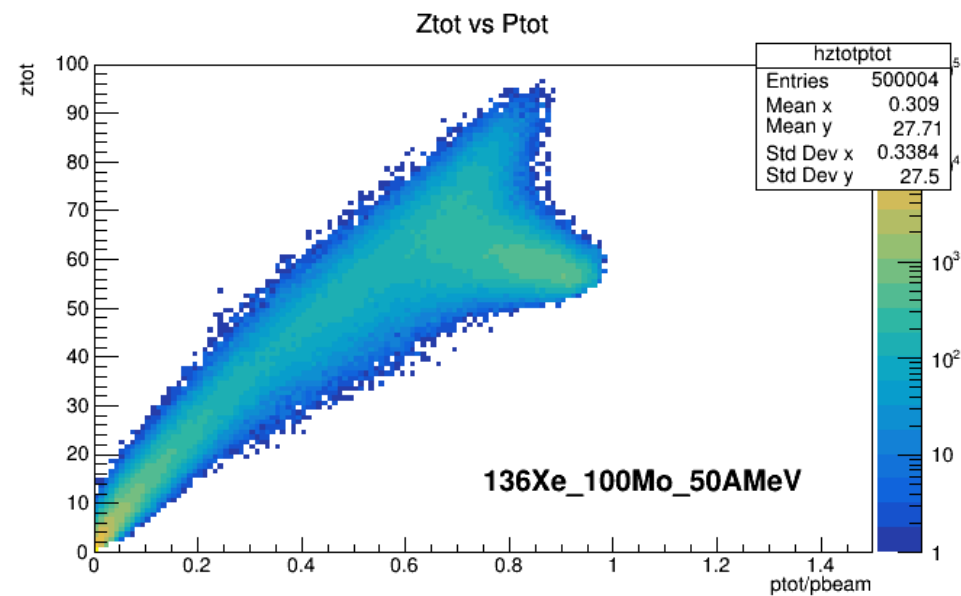
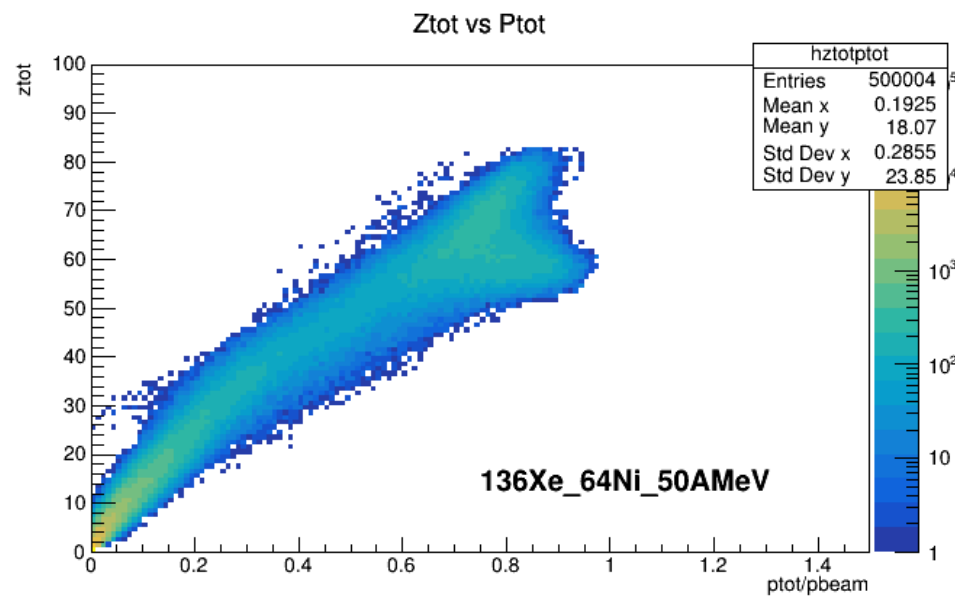
For flow observables ^{100}Mo may be better Hard to say a priori -> we need simulations!

For the moment we are testing the INDRA FAZIA response in terms of kinematics and identification with HIPSE simulations

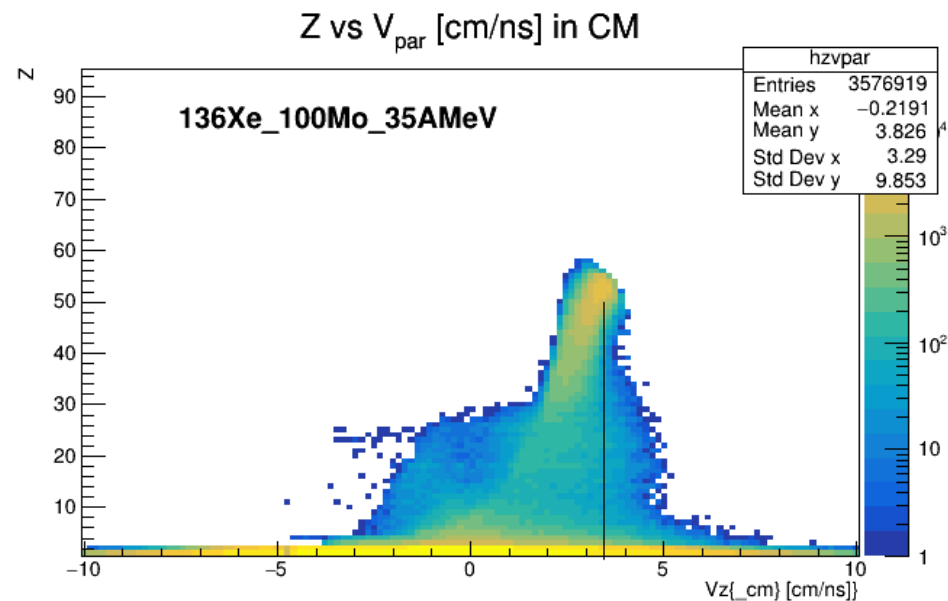
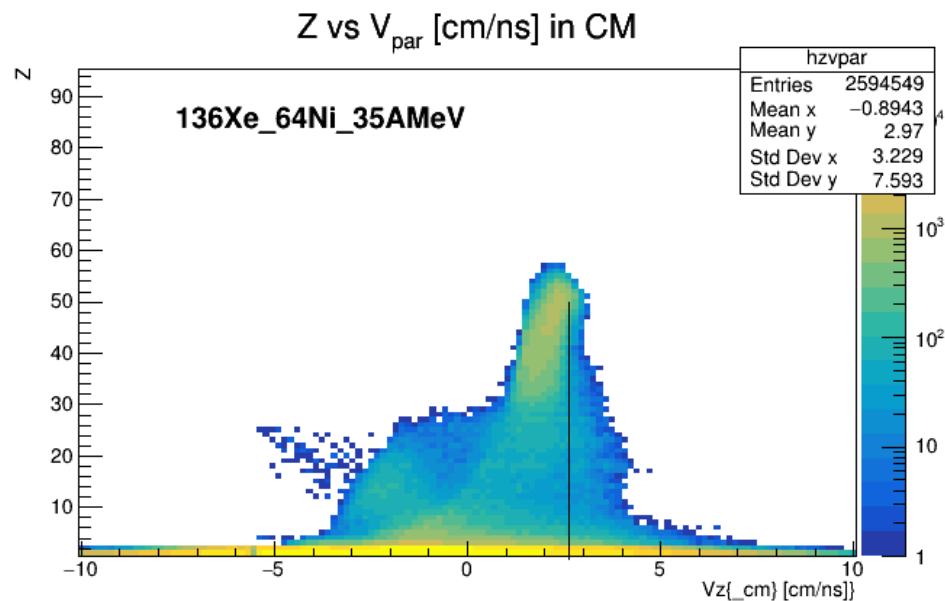
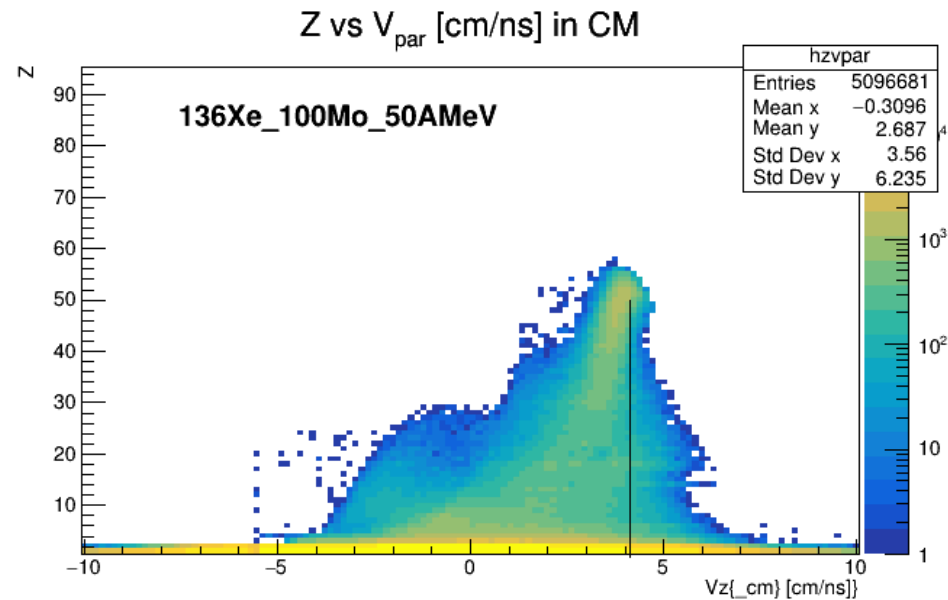
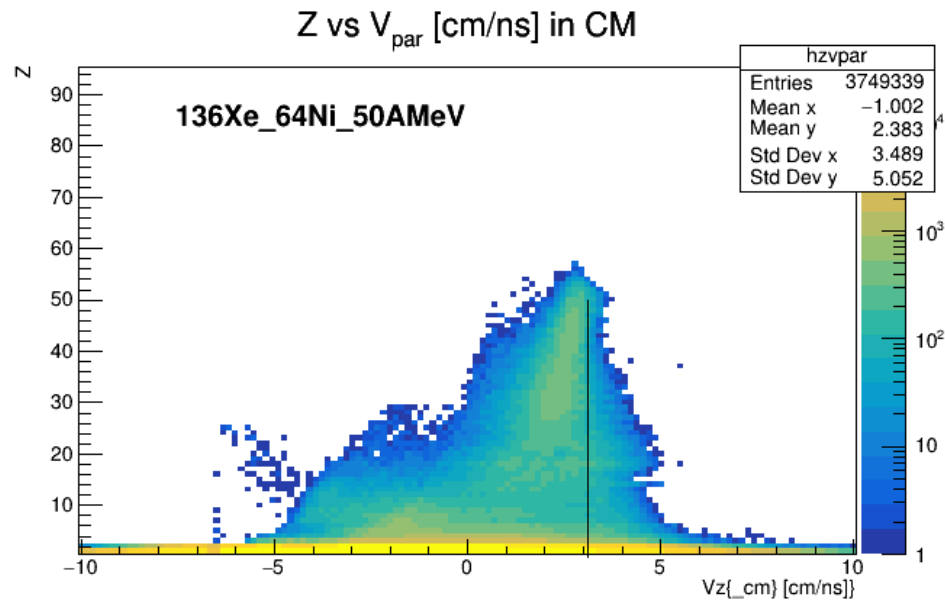
Geometrical configuration and filter:

- E884 geometry
- New mix-and match by John

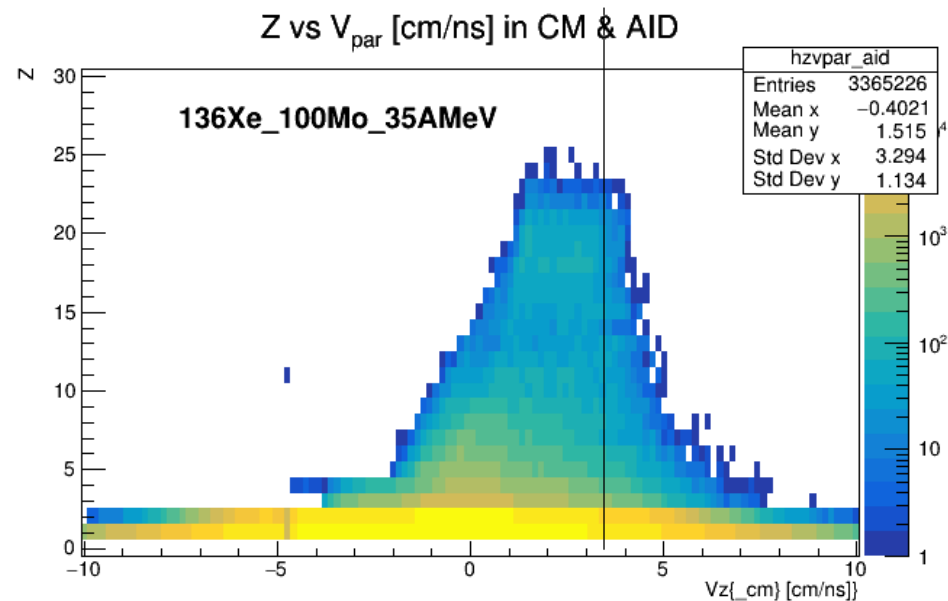
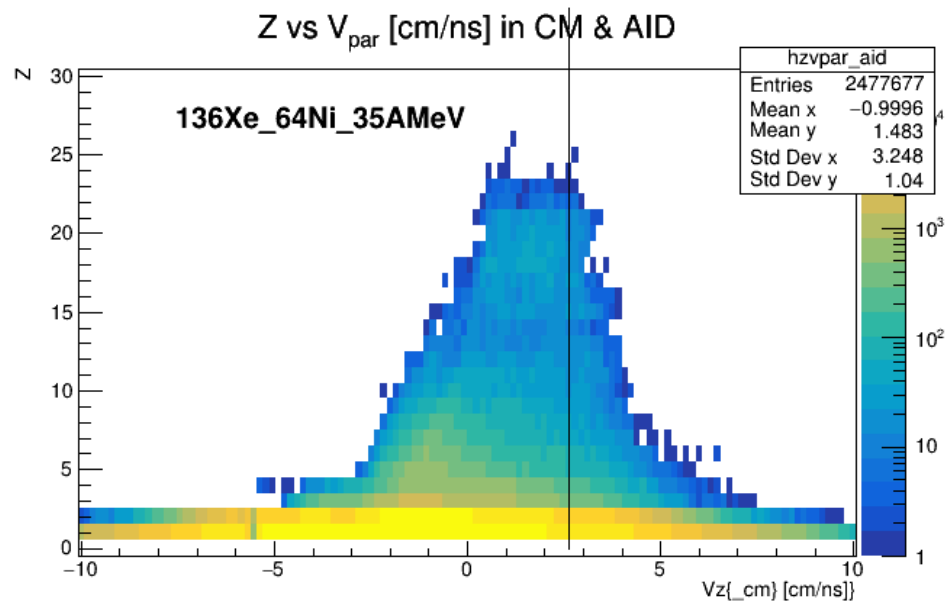
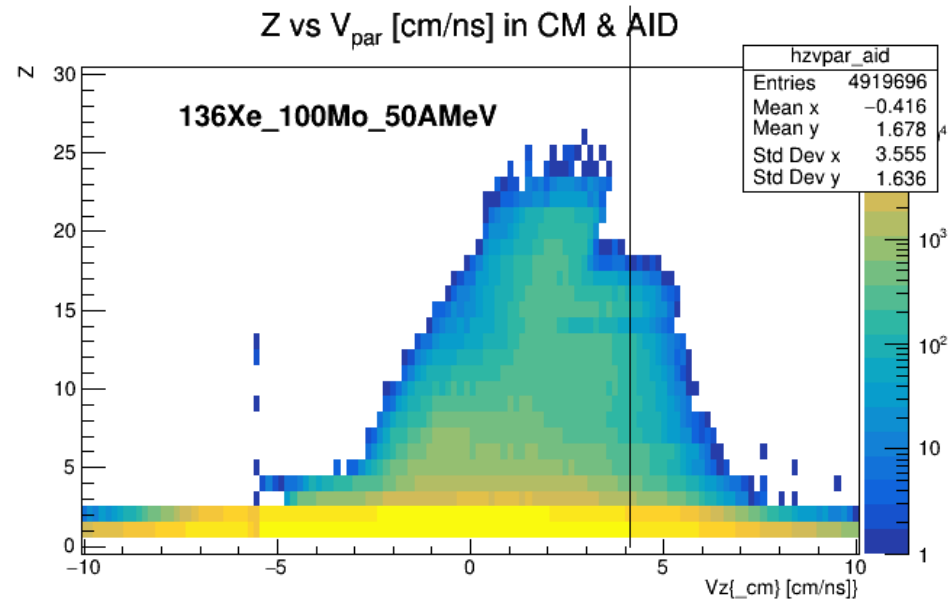
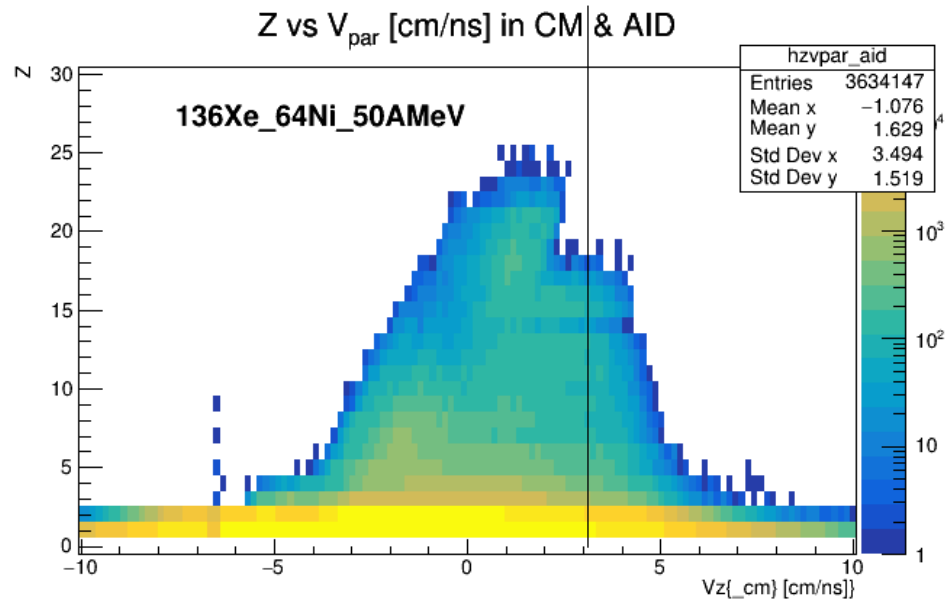
HIPSE simulation results for PAC GANIL



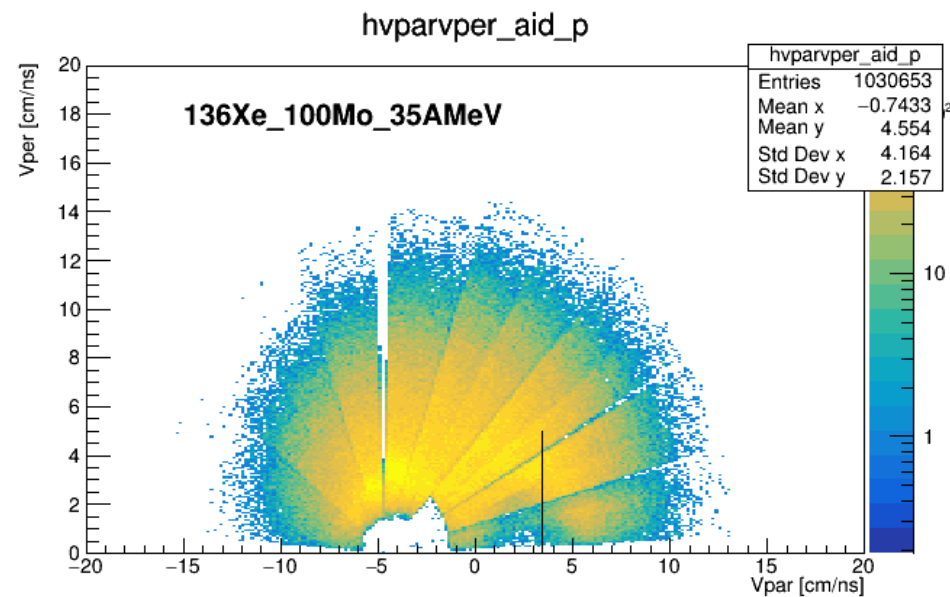
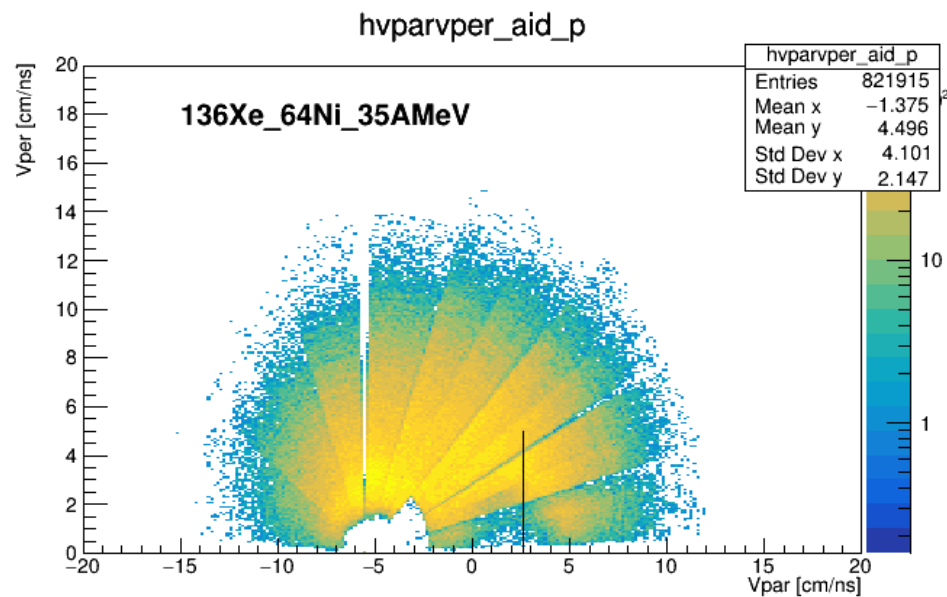
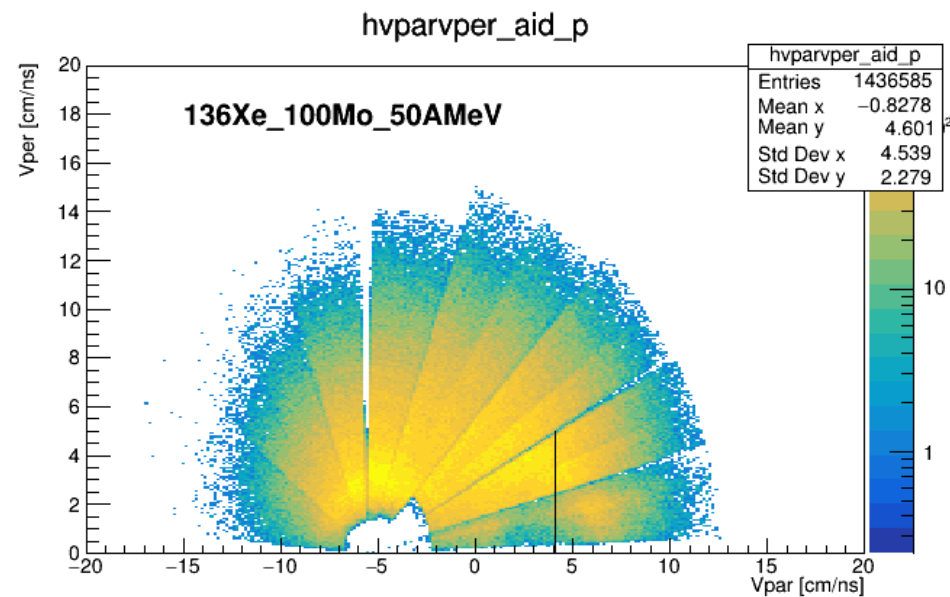
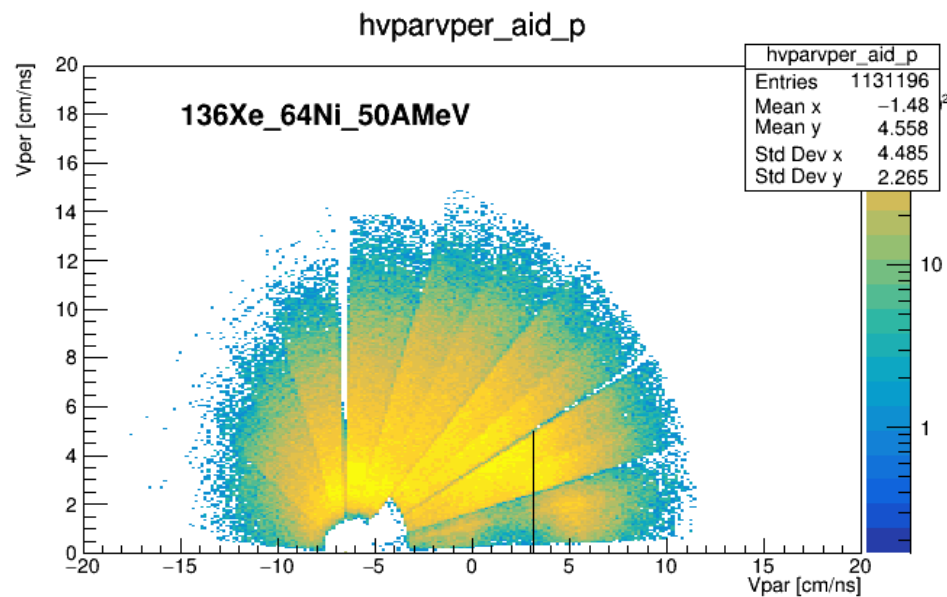
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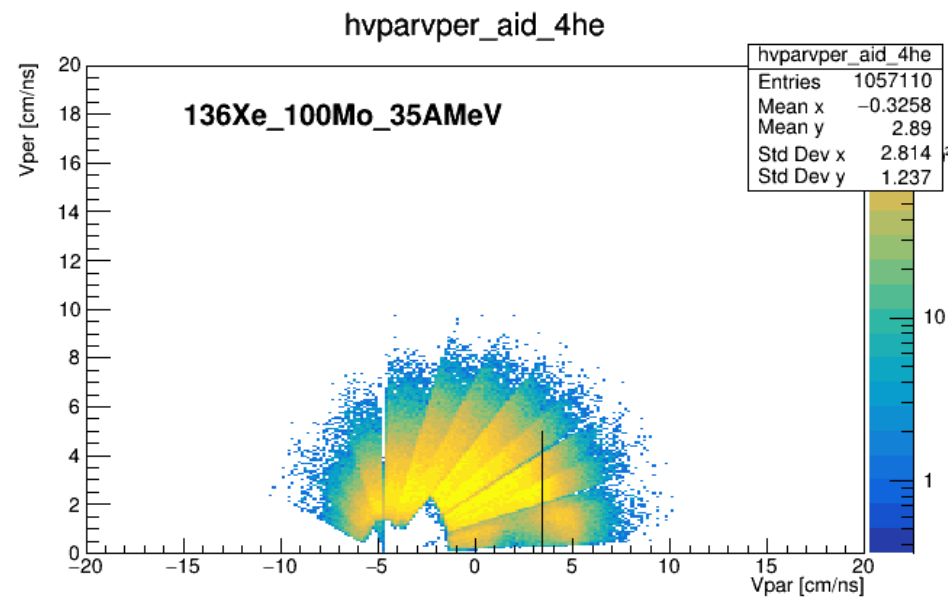
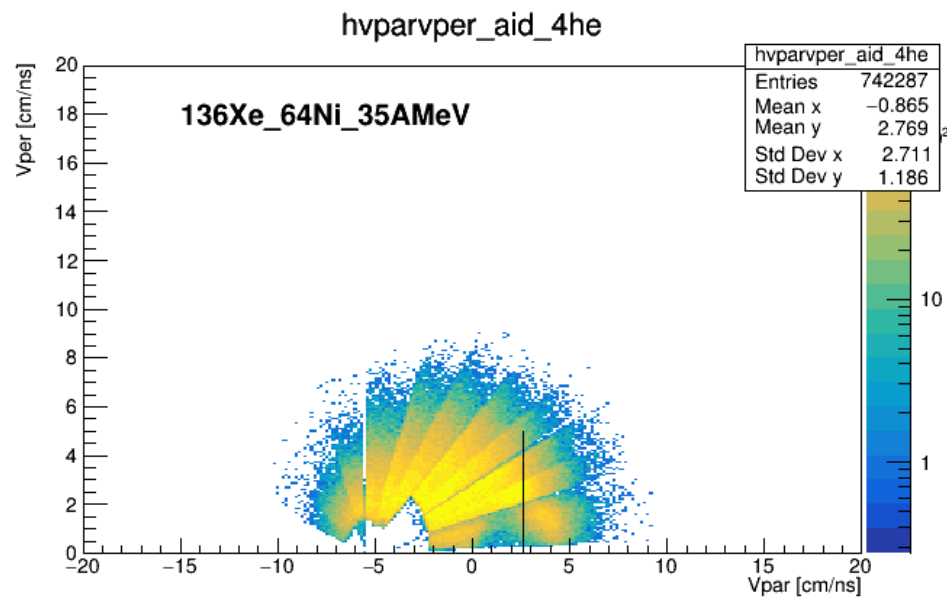
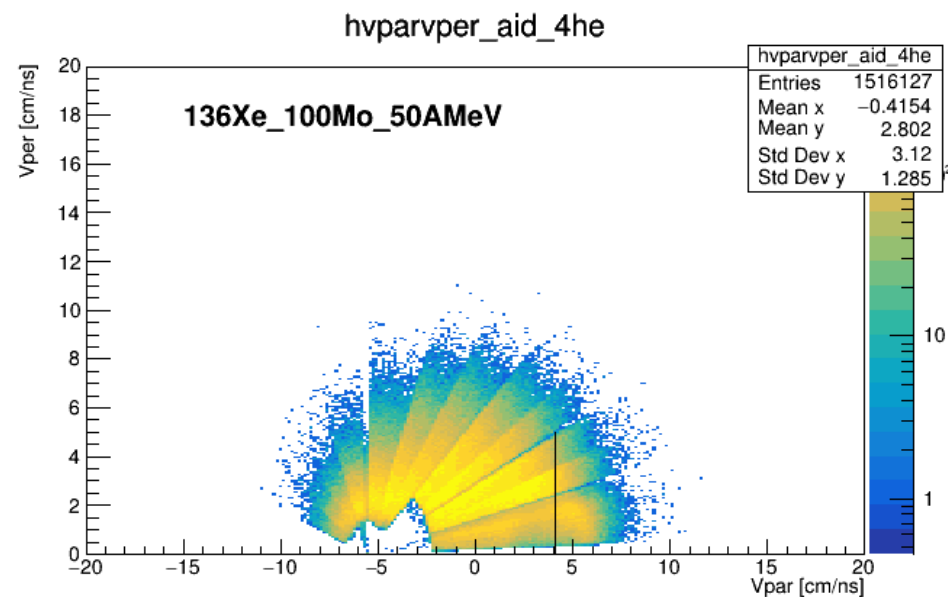
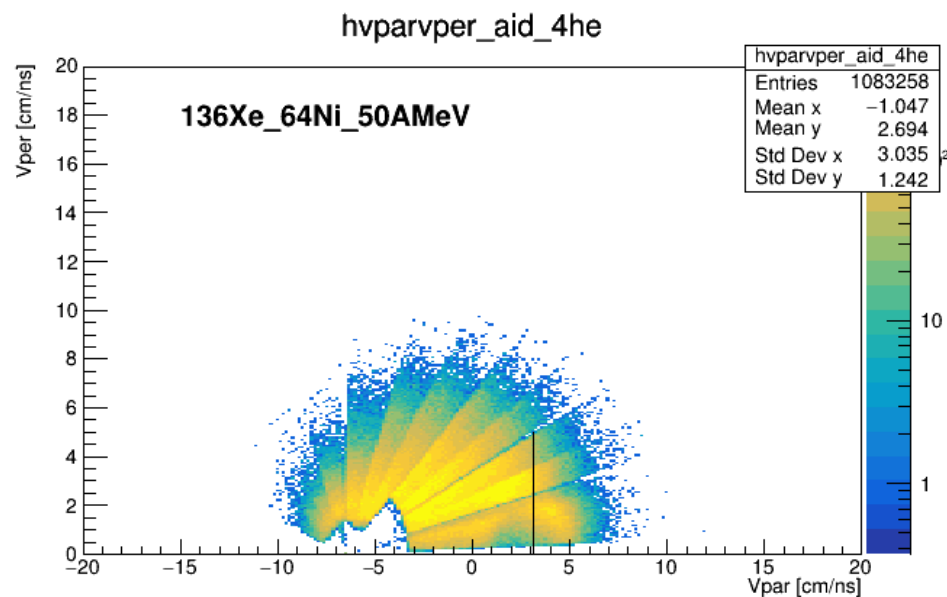
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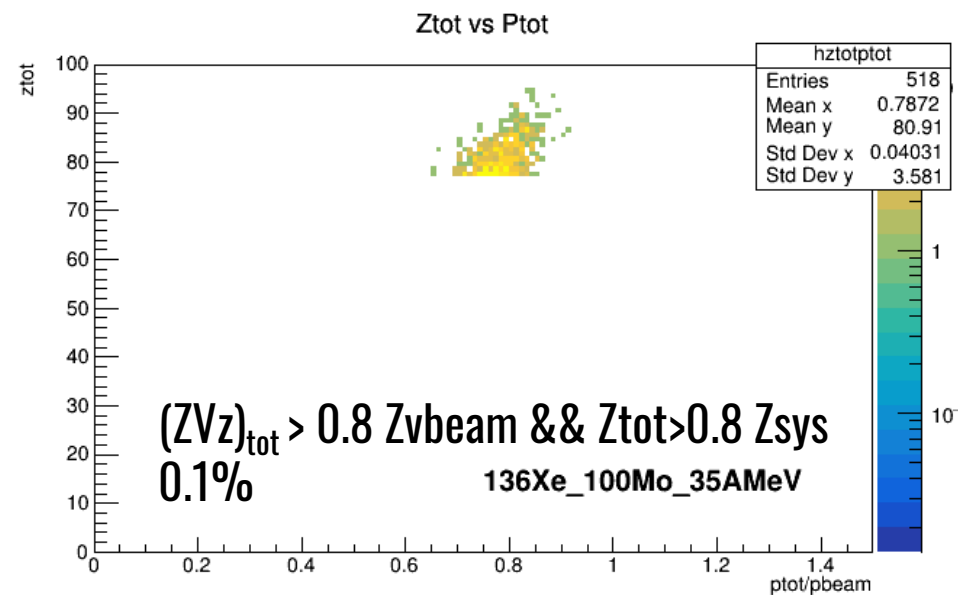
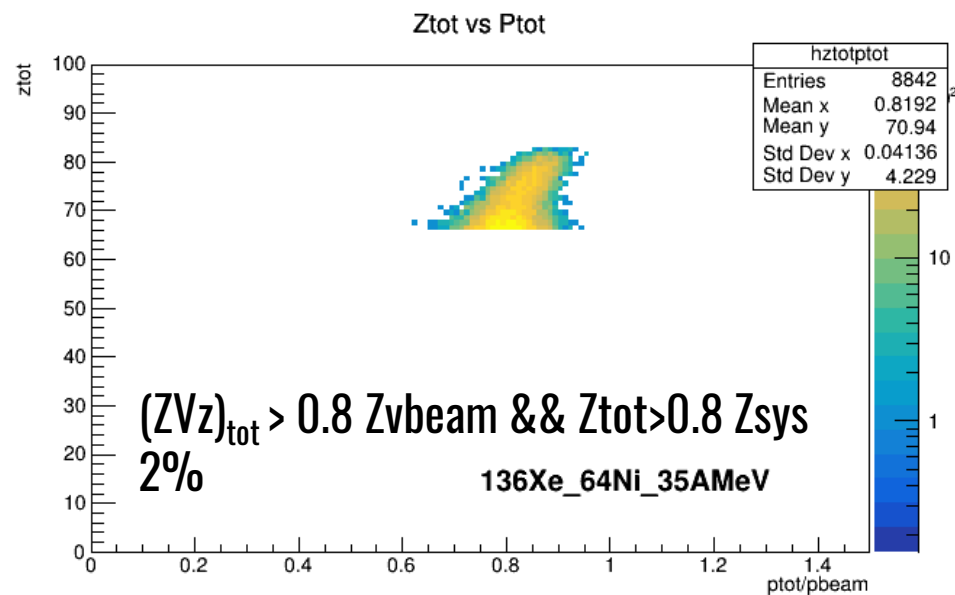
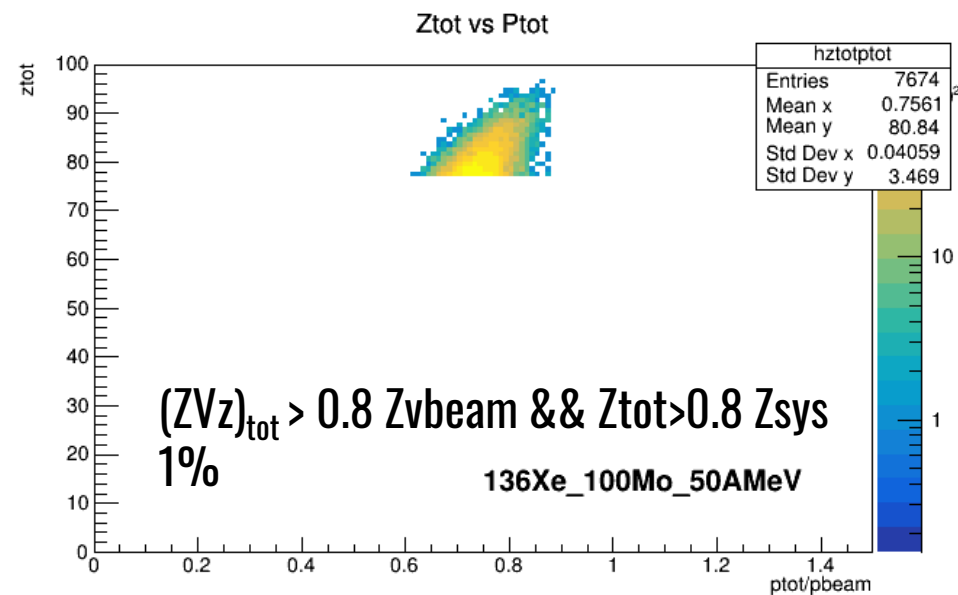
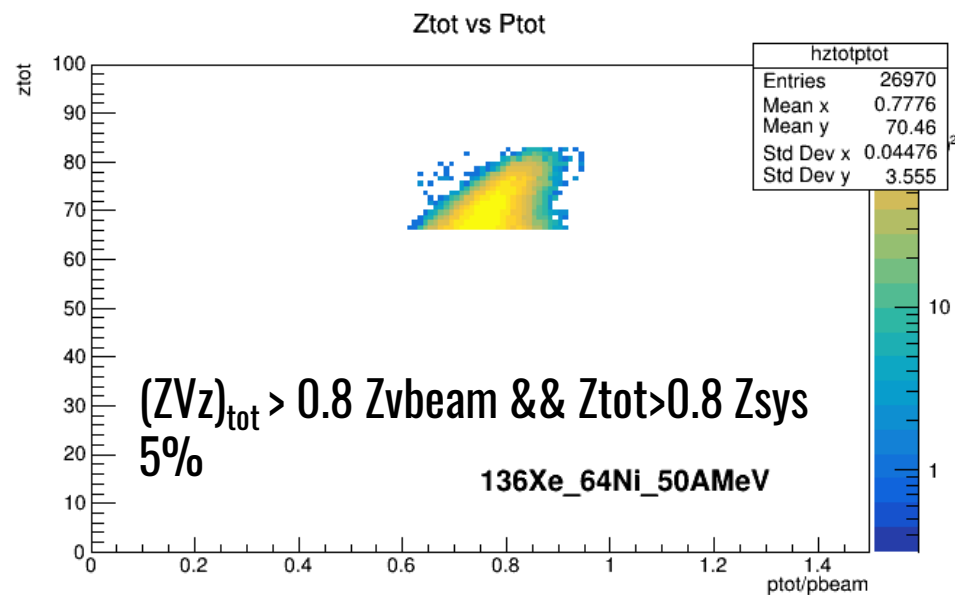
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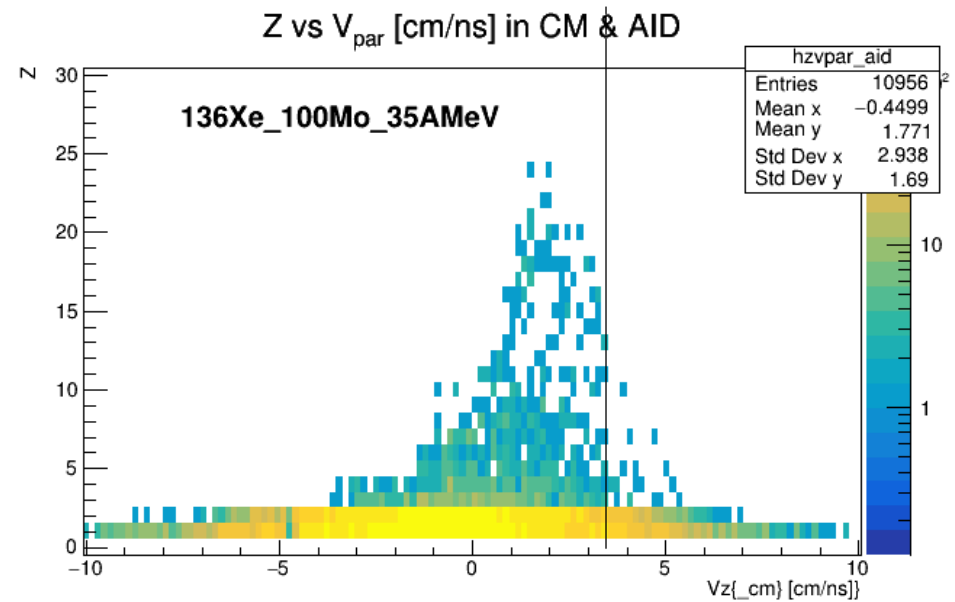
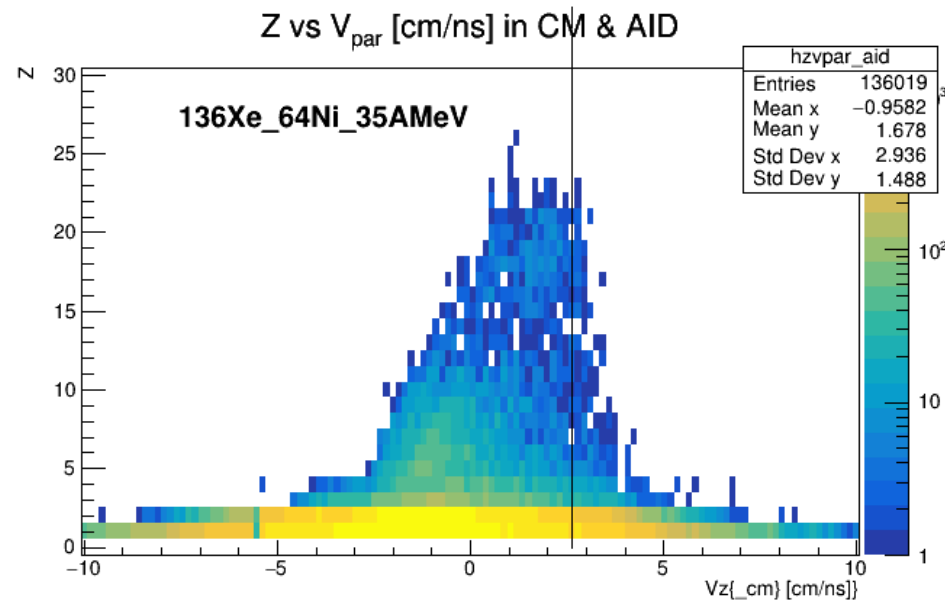
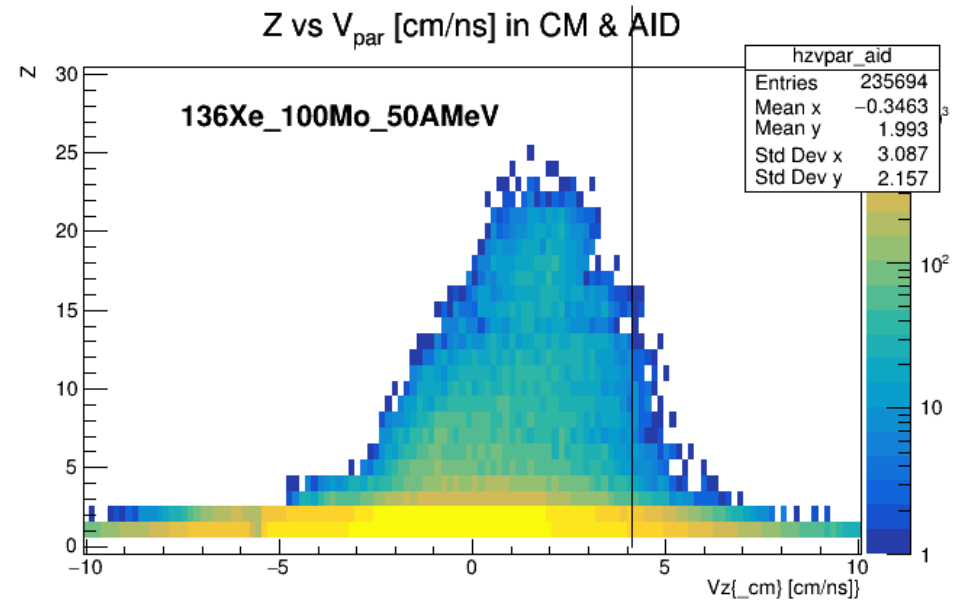
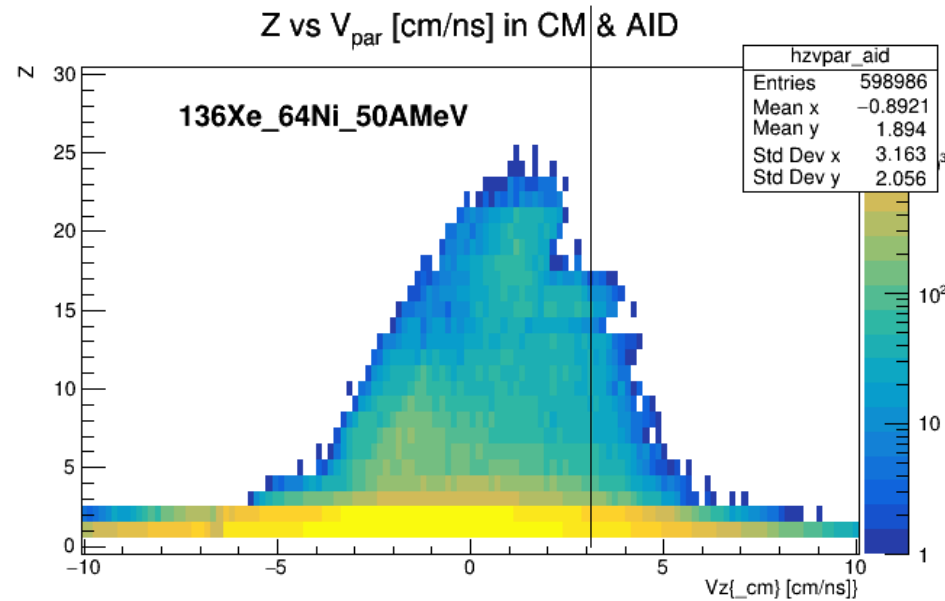
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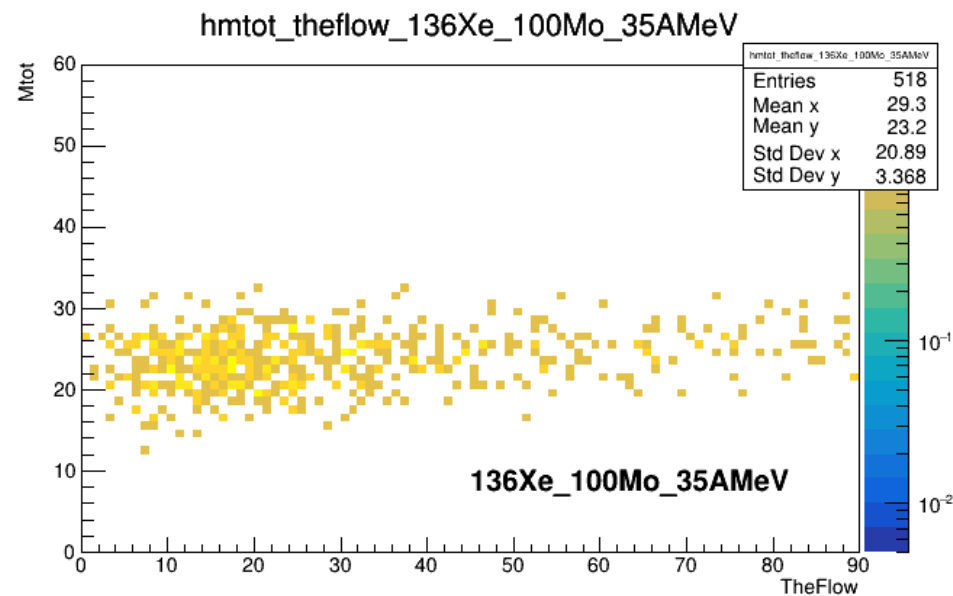
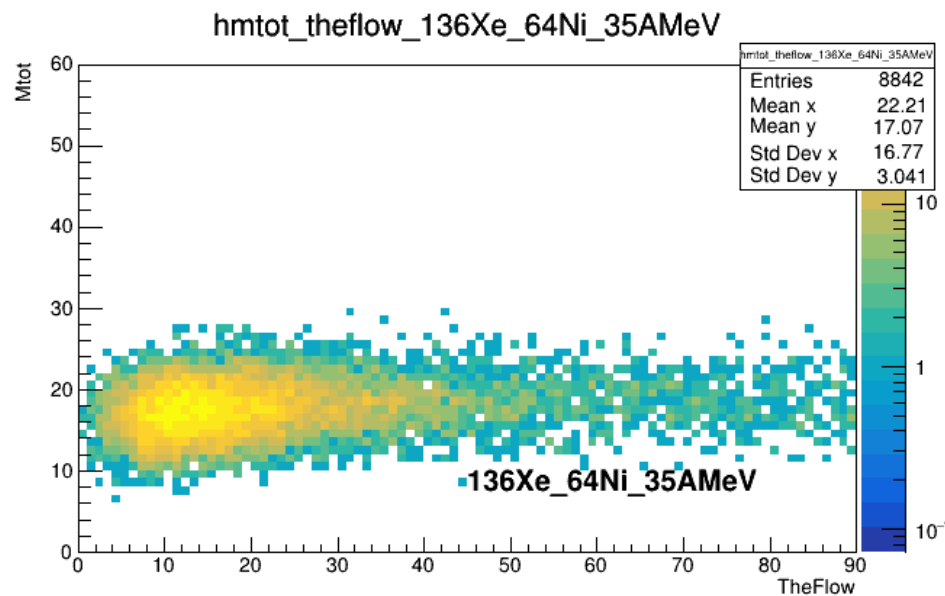
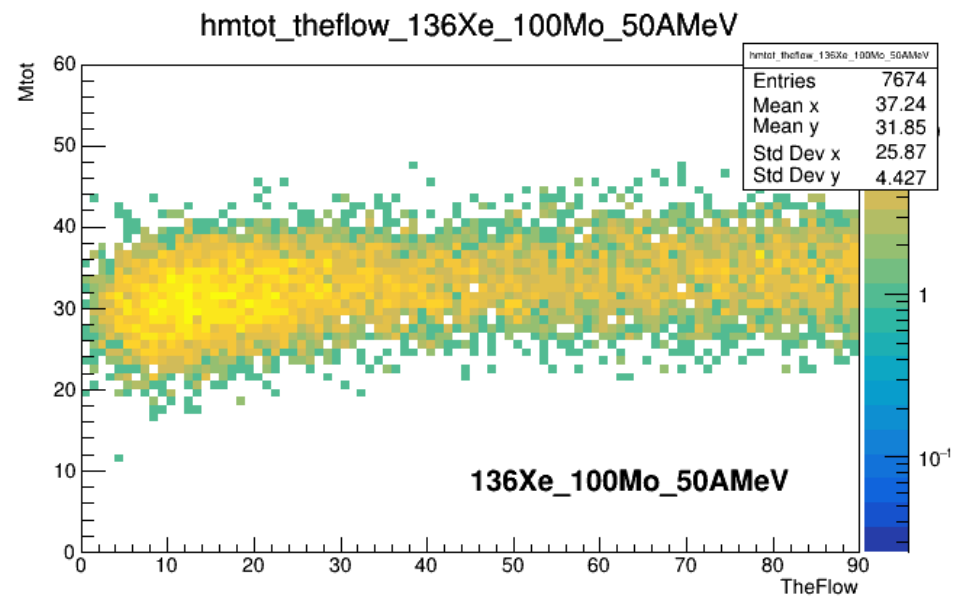
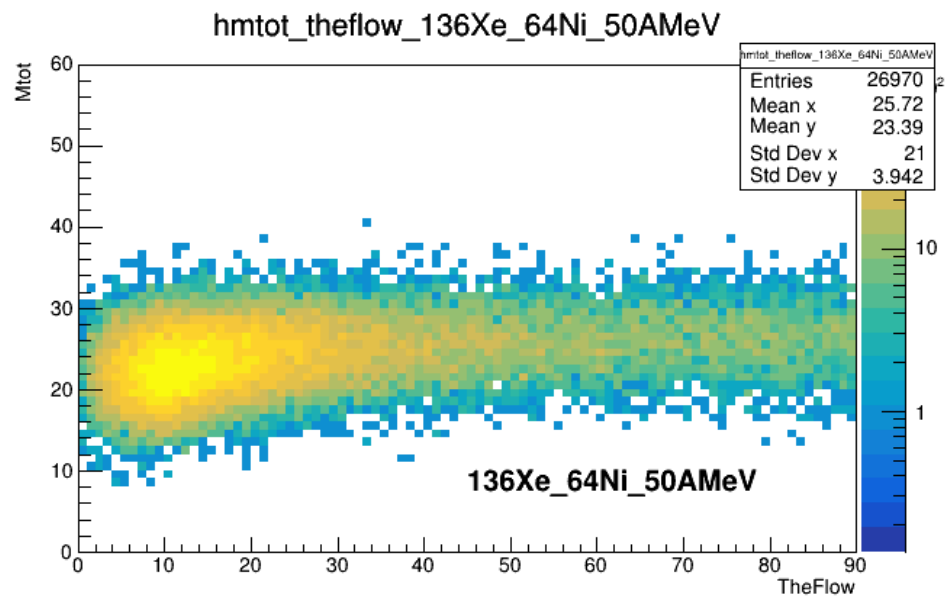
HIPSE simulation results for PAC GANIL – Classic Single Source Selection



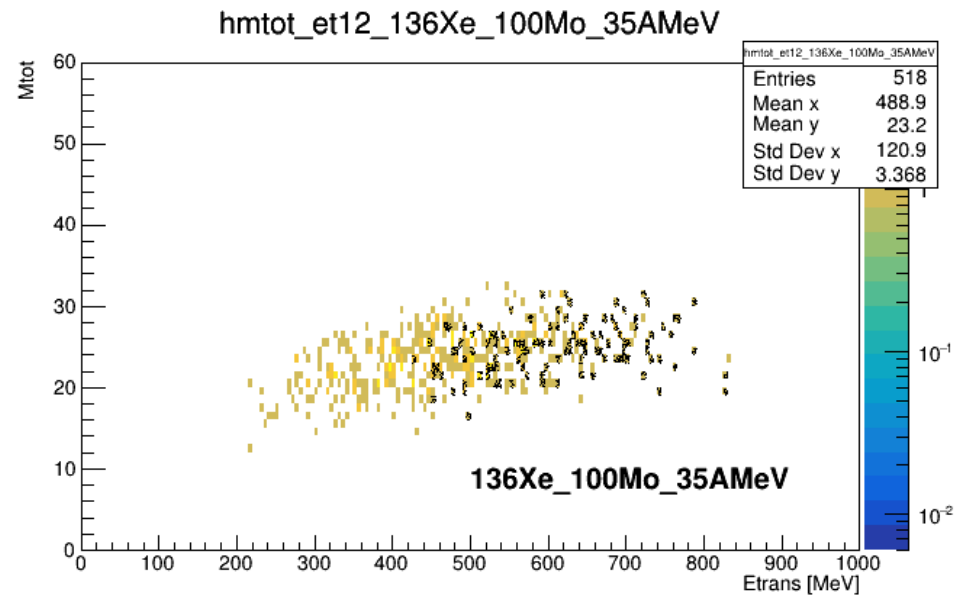
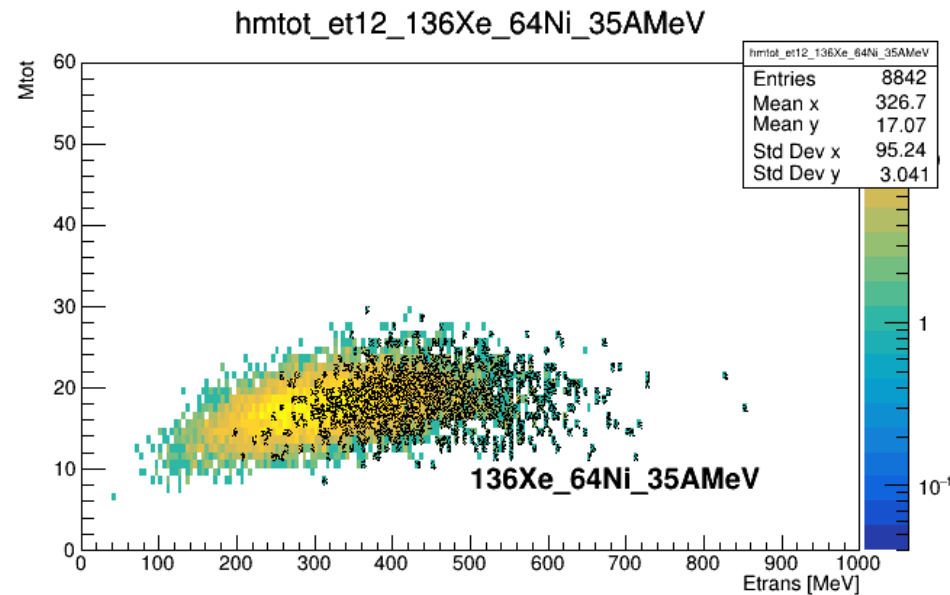
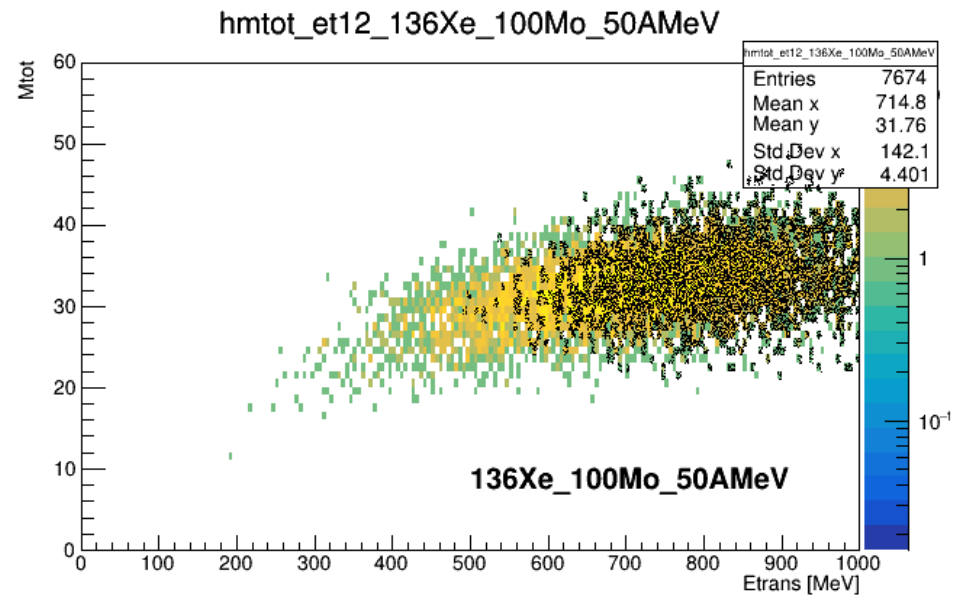
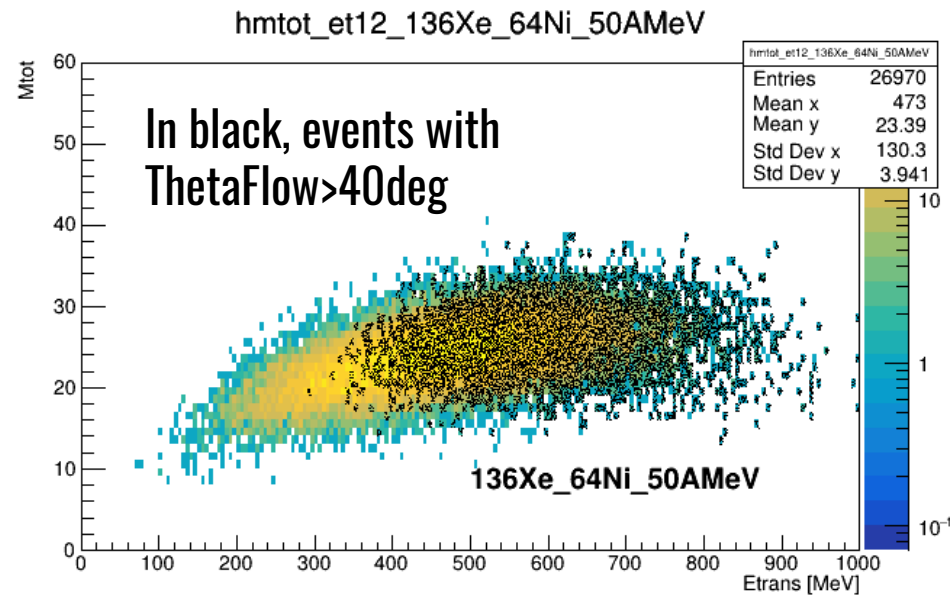
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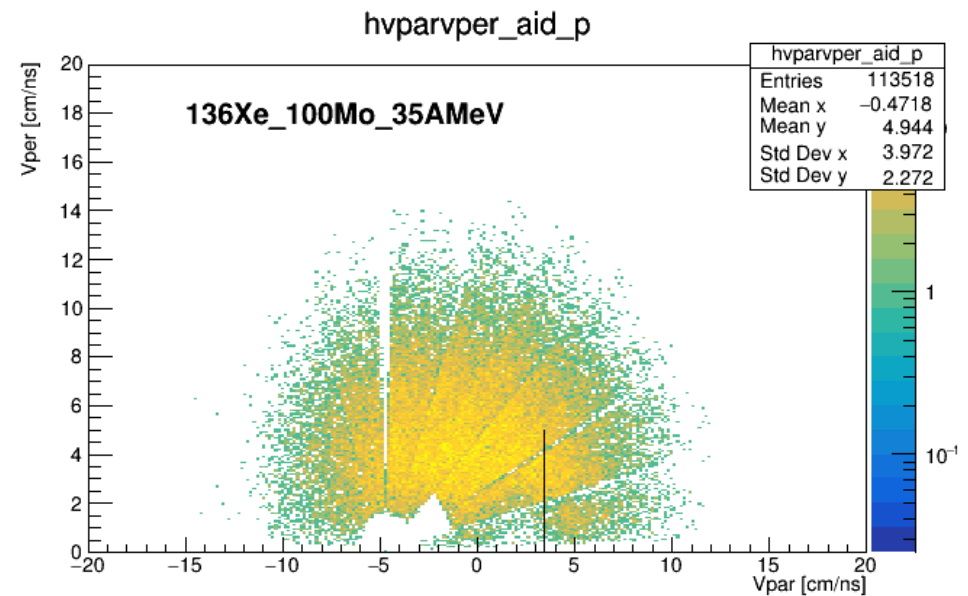
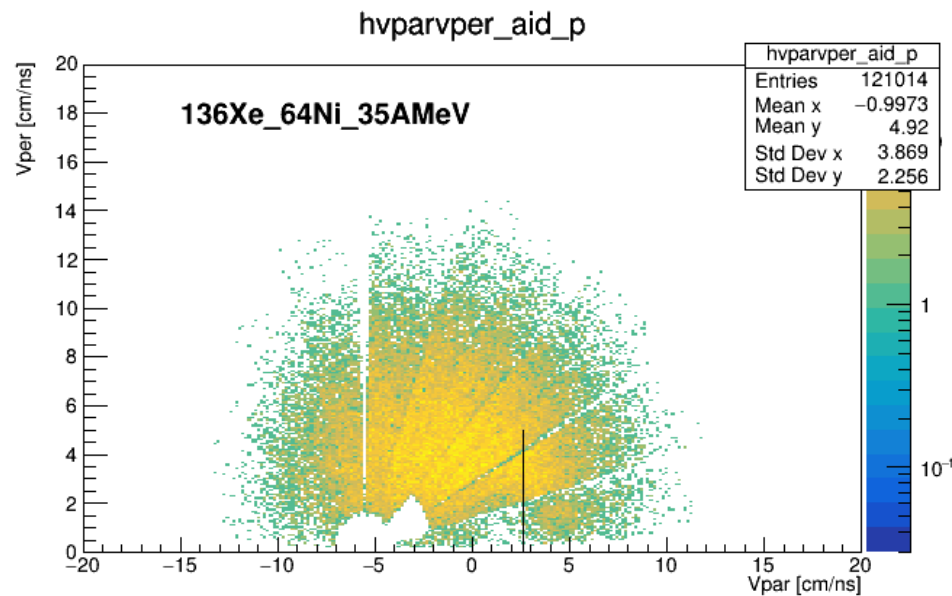
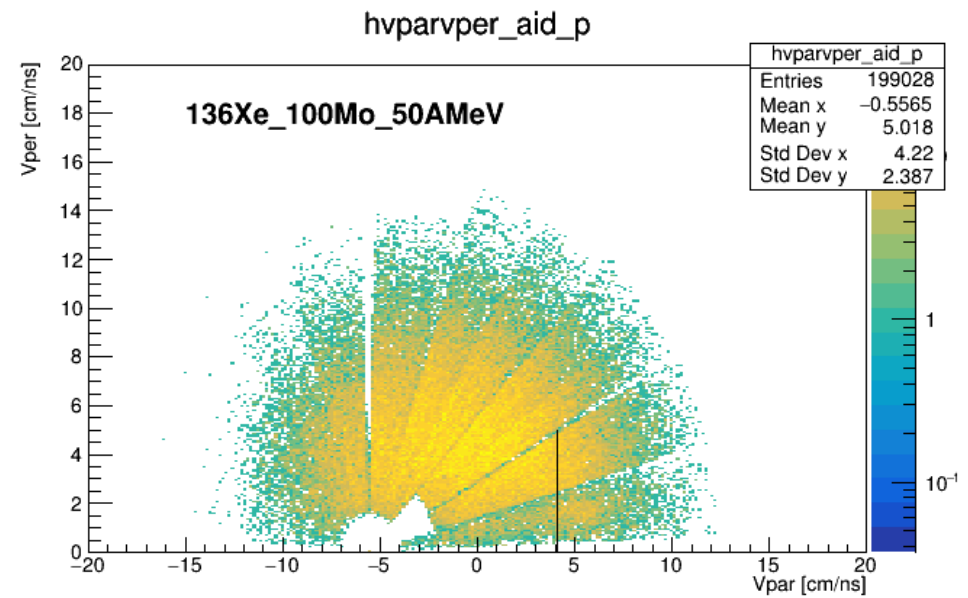
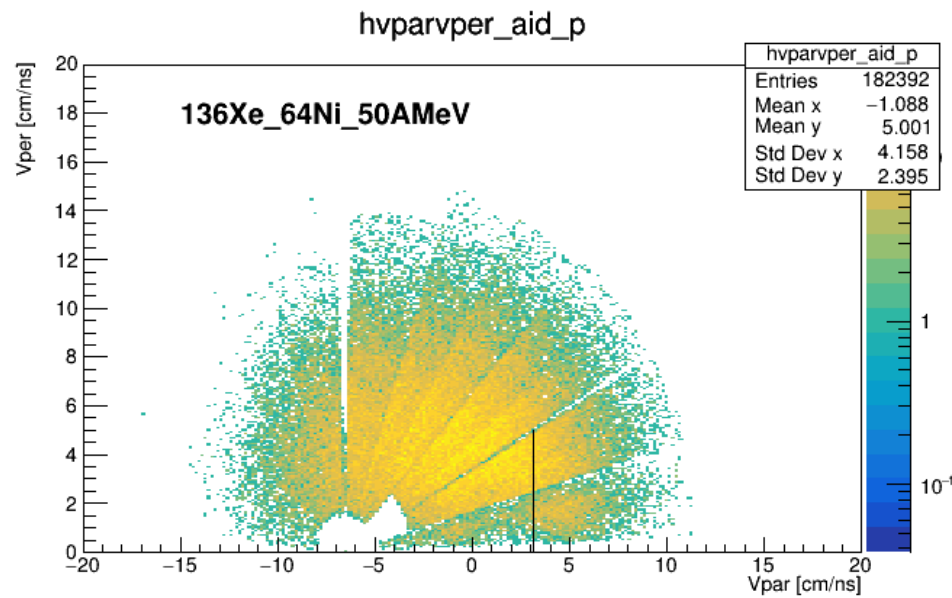
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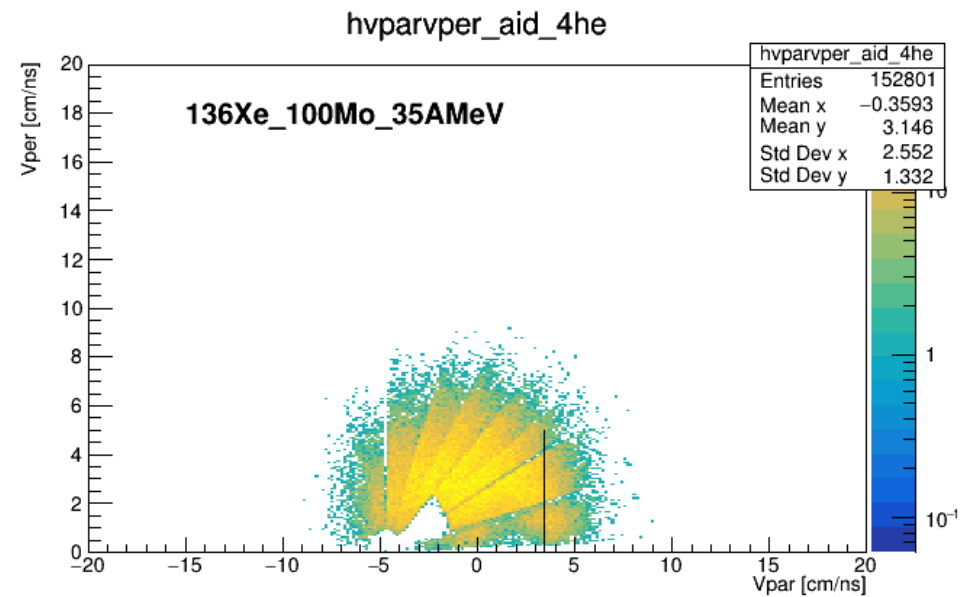
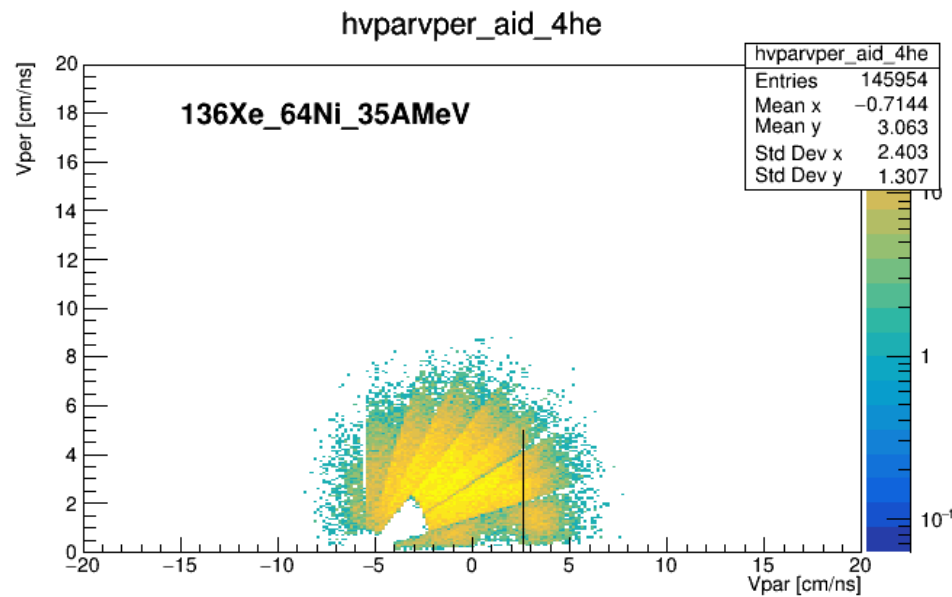
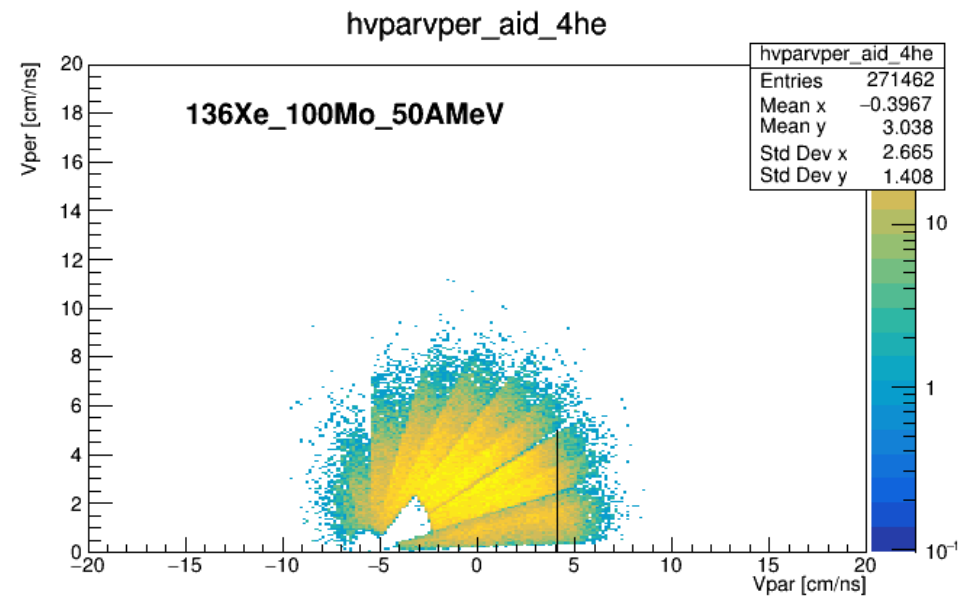
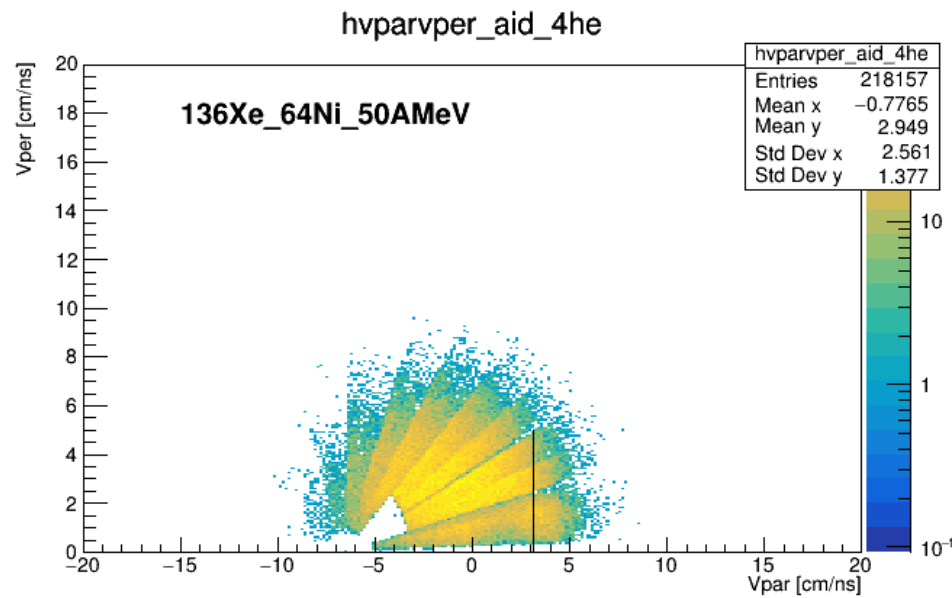
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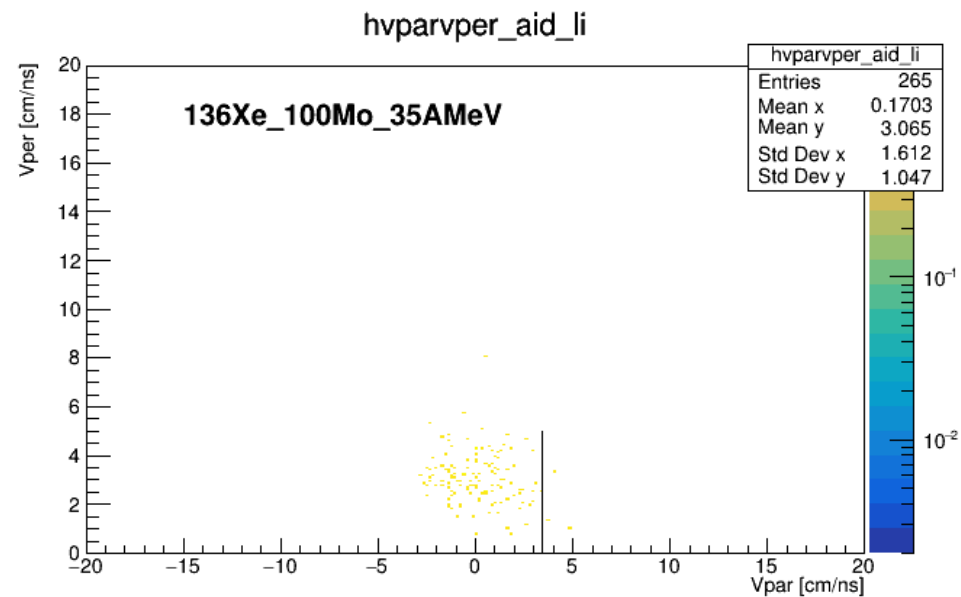
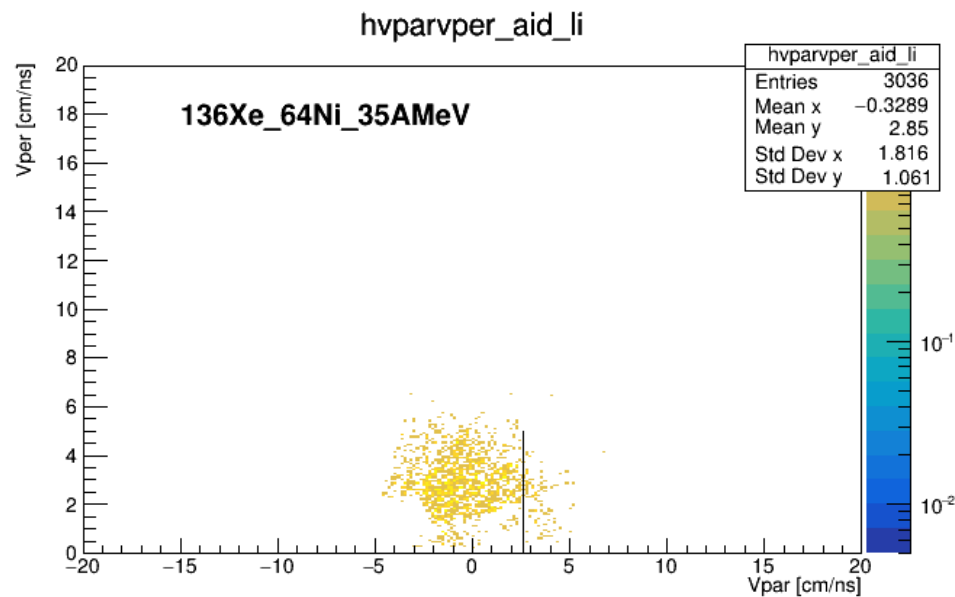
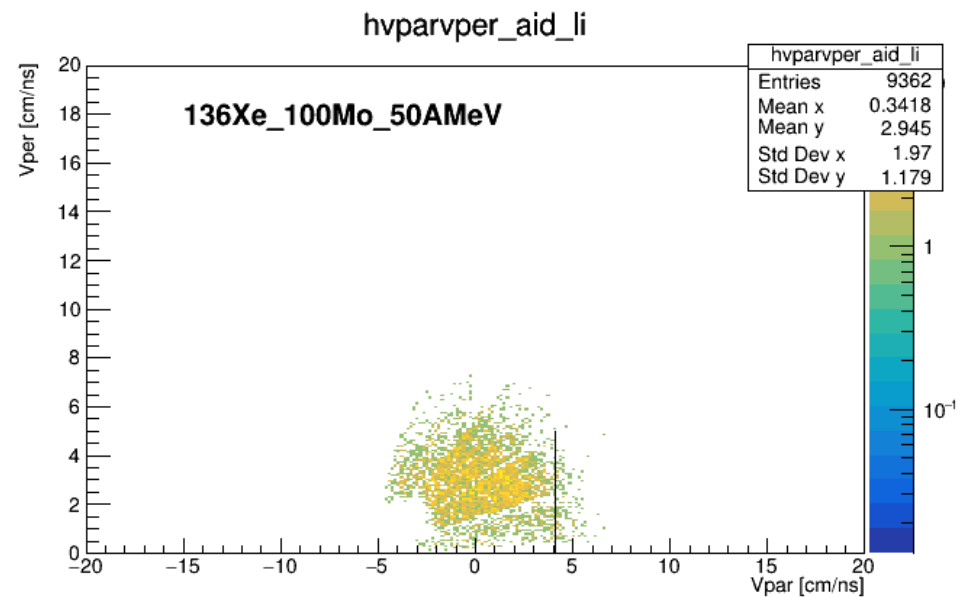
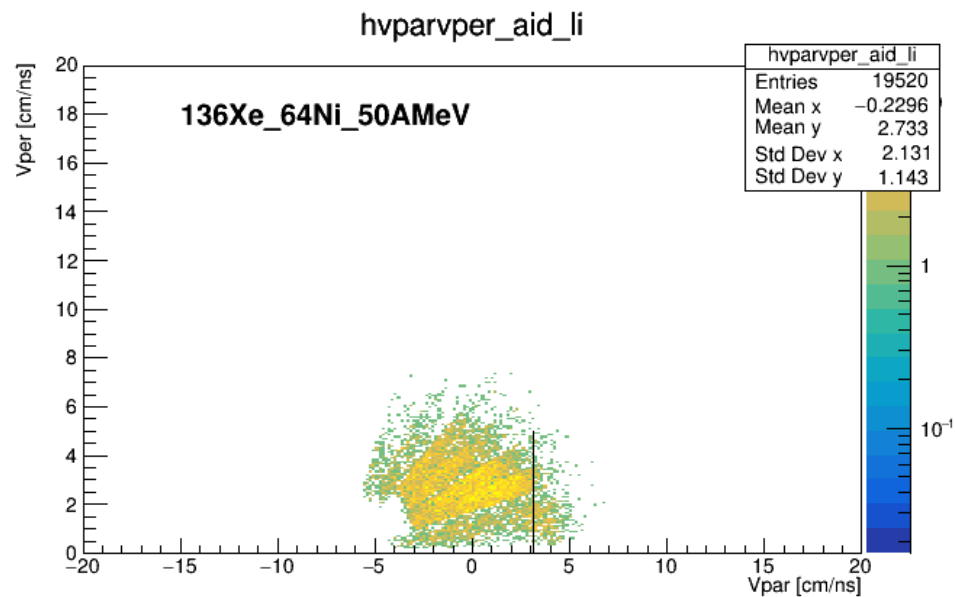
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