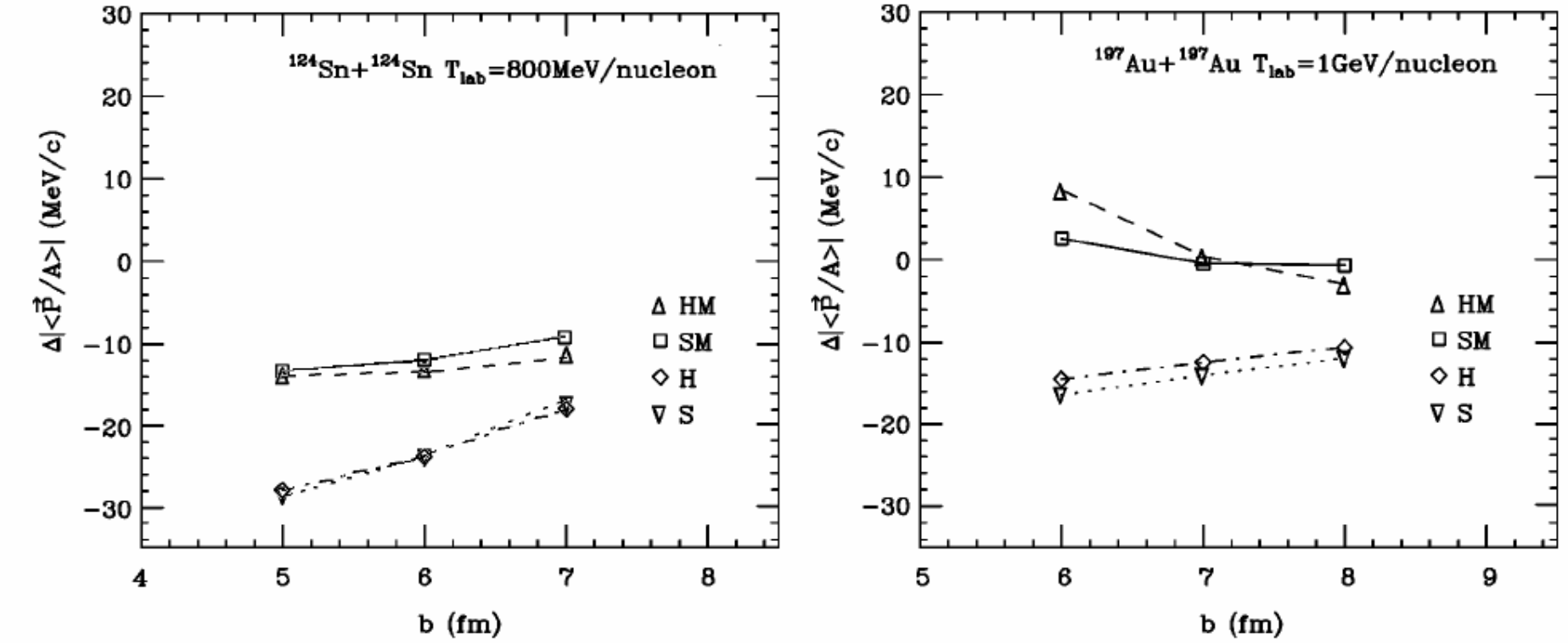
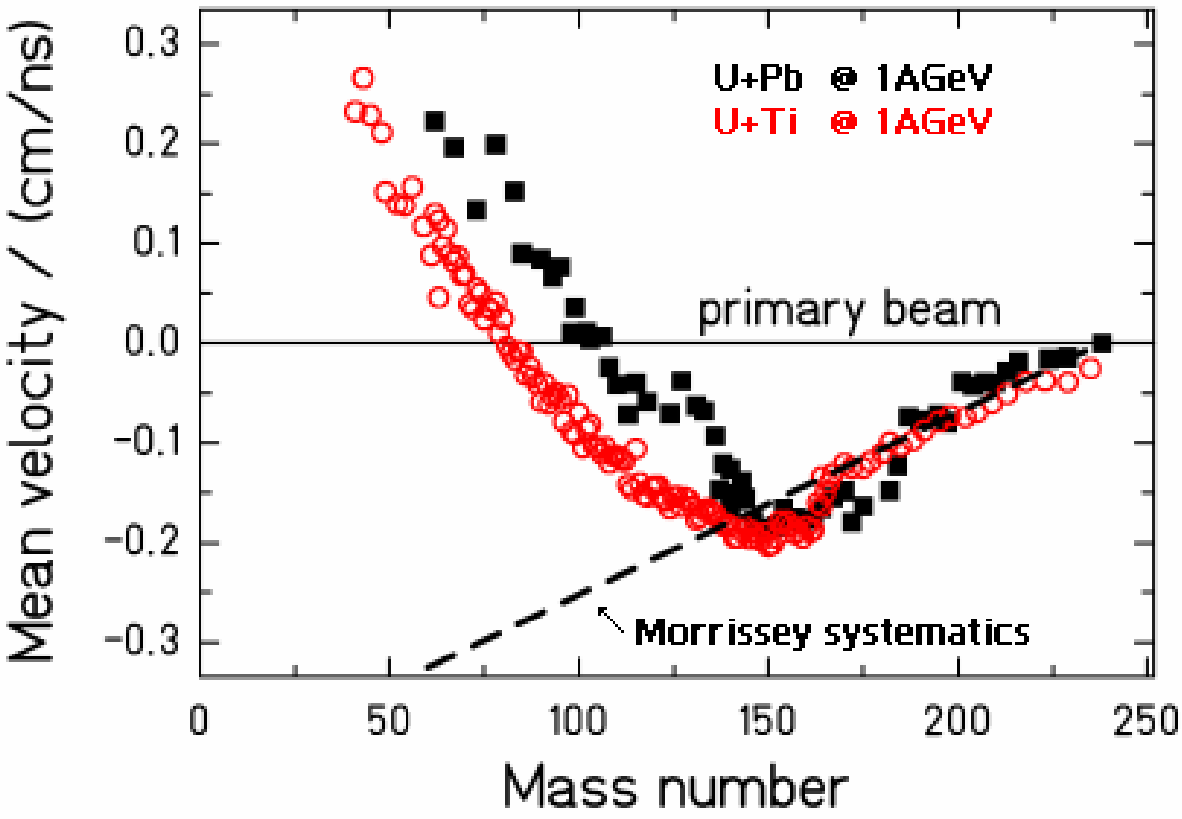
Spectator response to the participant blast

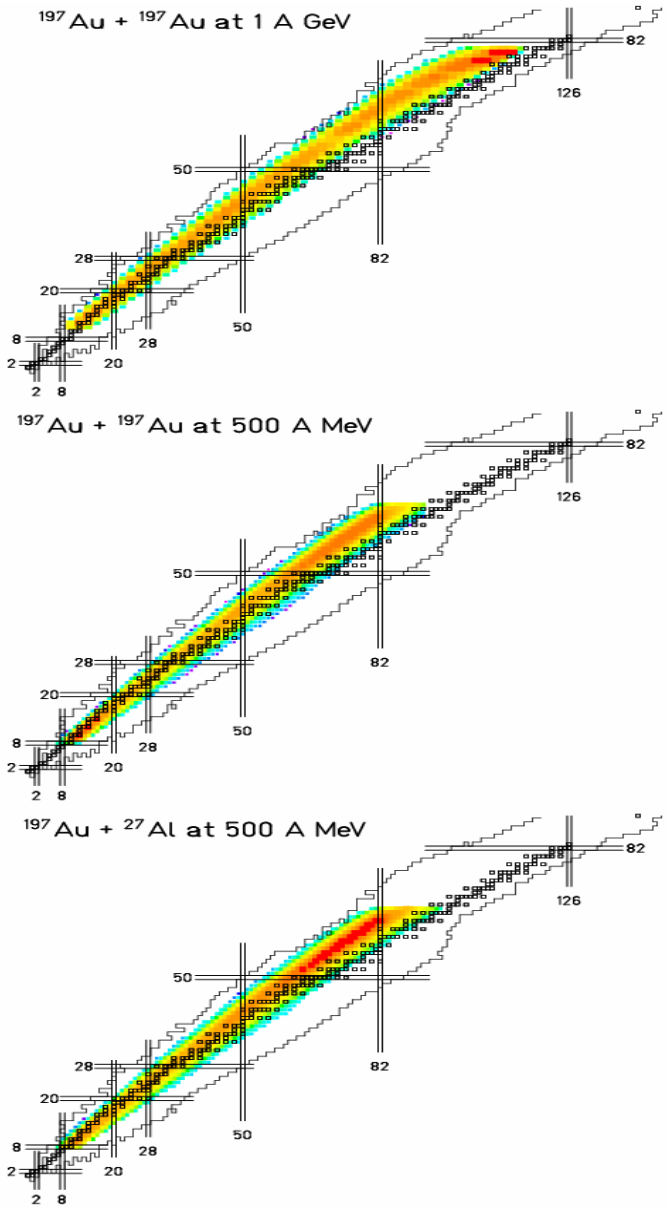
Vladimir Henzl

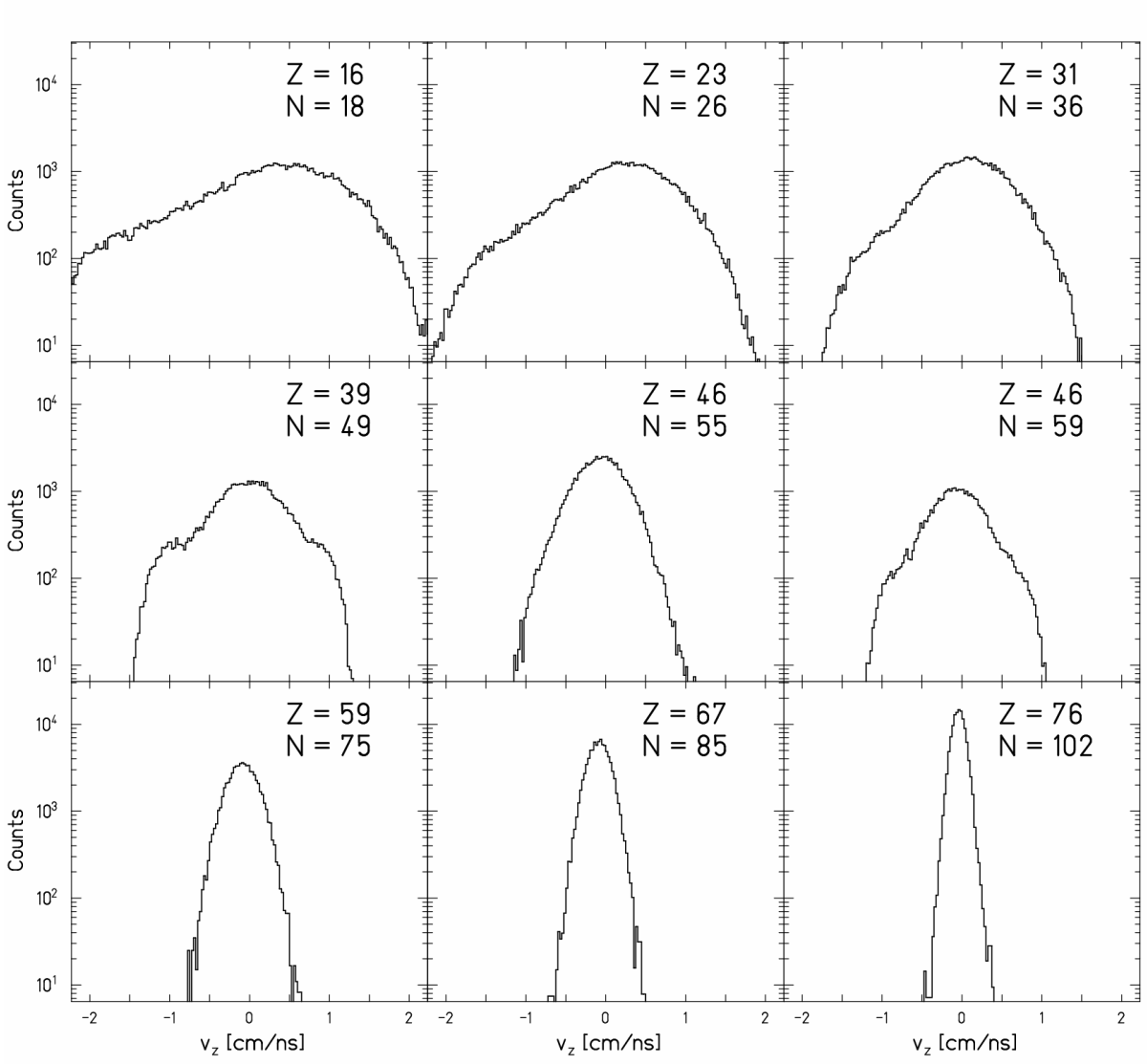


Theory: Spectator response to the participant blast
(Shi, Danielewicz and Lacy, 2001)

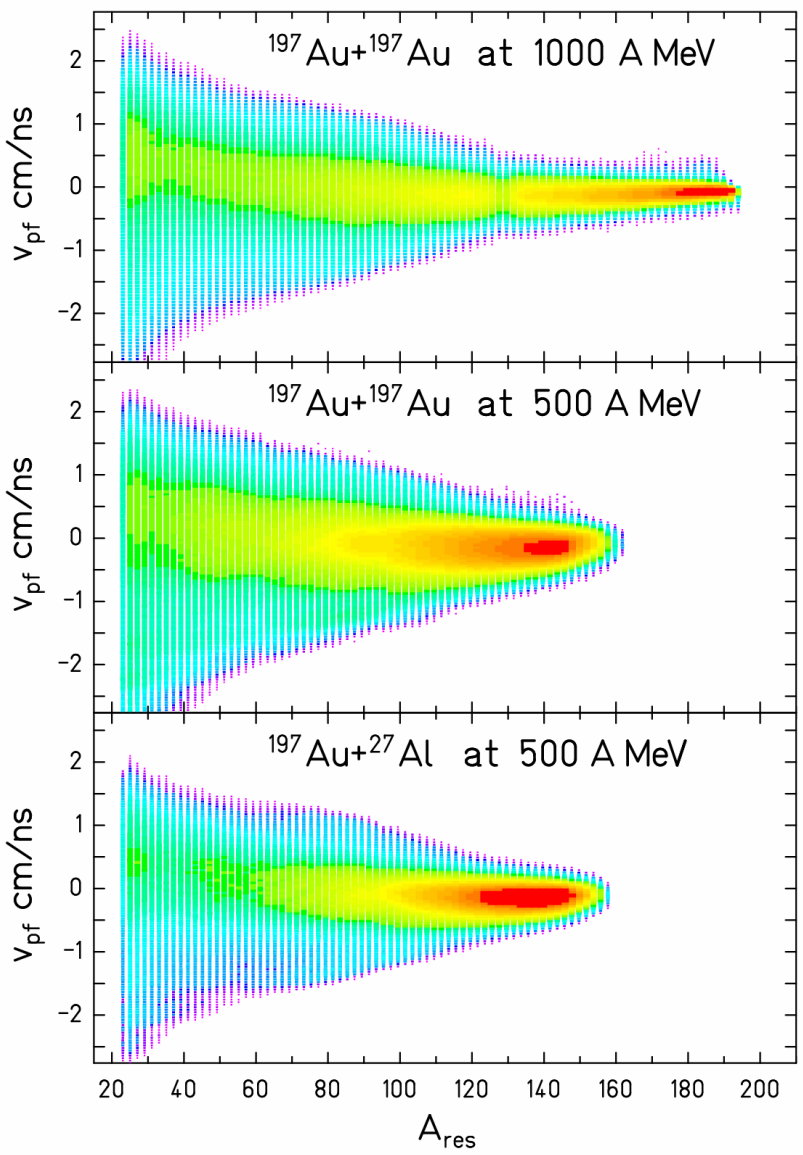


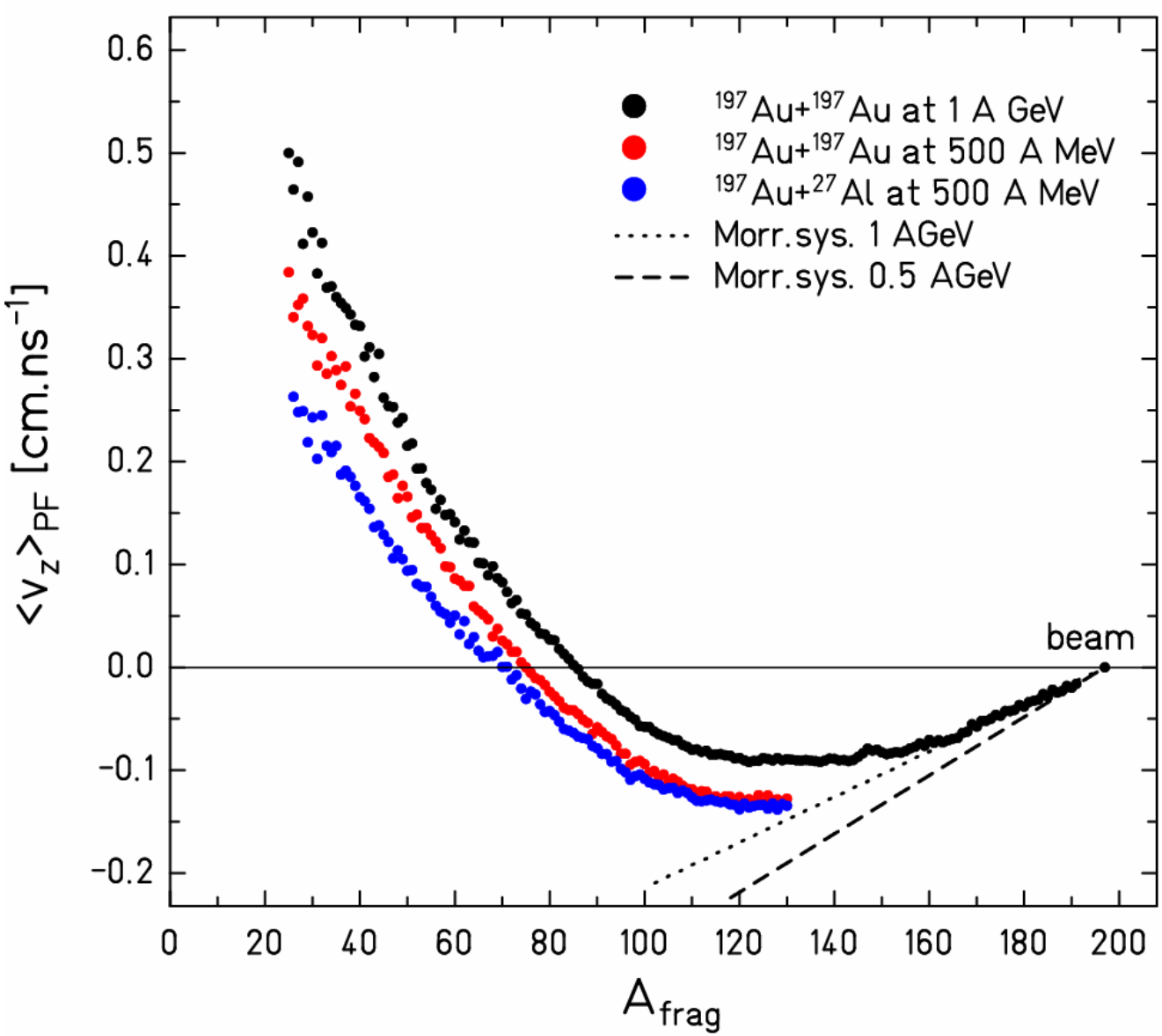
T. Enqvist et al., M. V. Ricciardi et al.

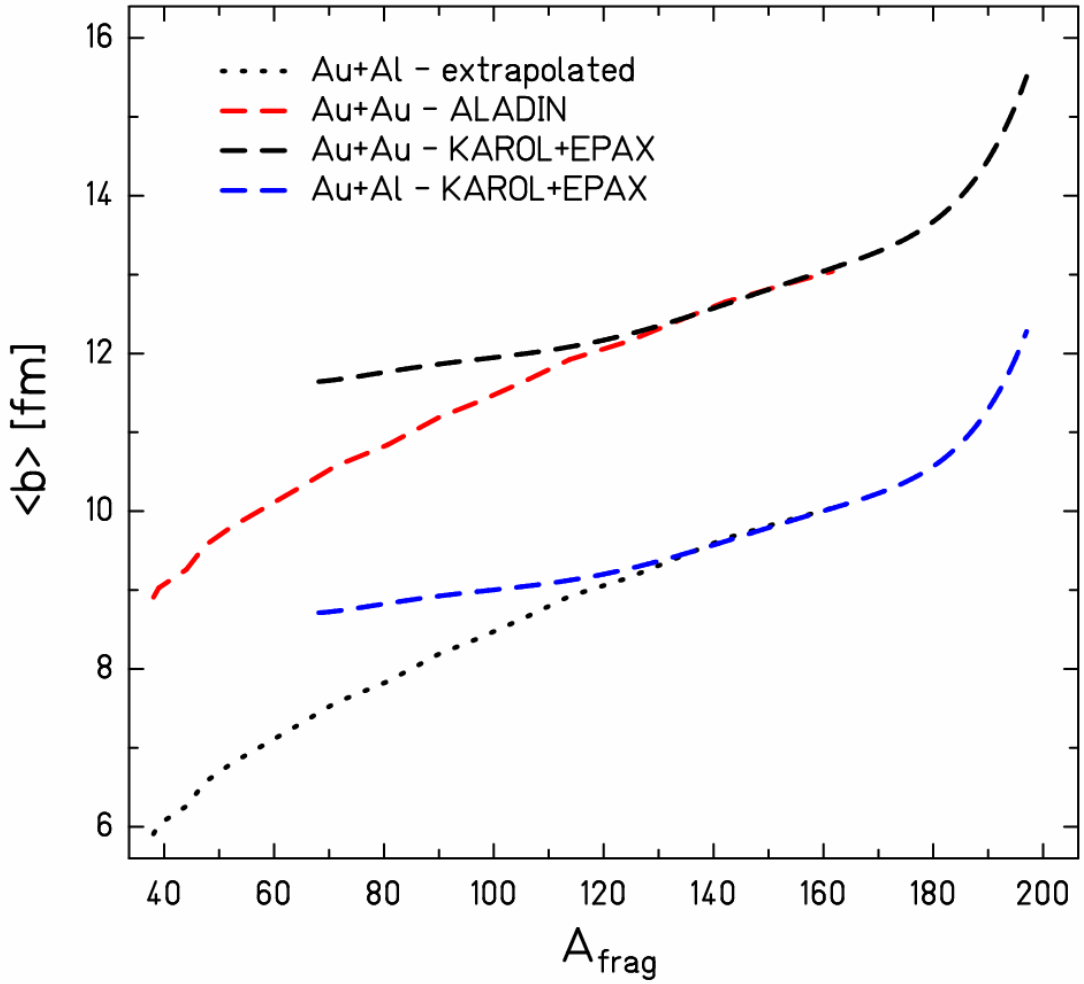

197Au + 197Au at 1 A GeV
197Au + 197Au at 500 A MeV
197Au + 27Al at 500 A MeV
2
8
20
28
50
82
126



197Au + 197Au, 1 A GeV

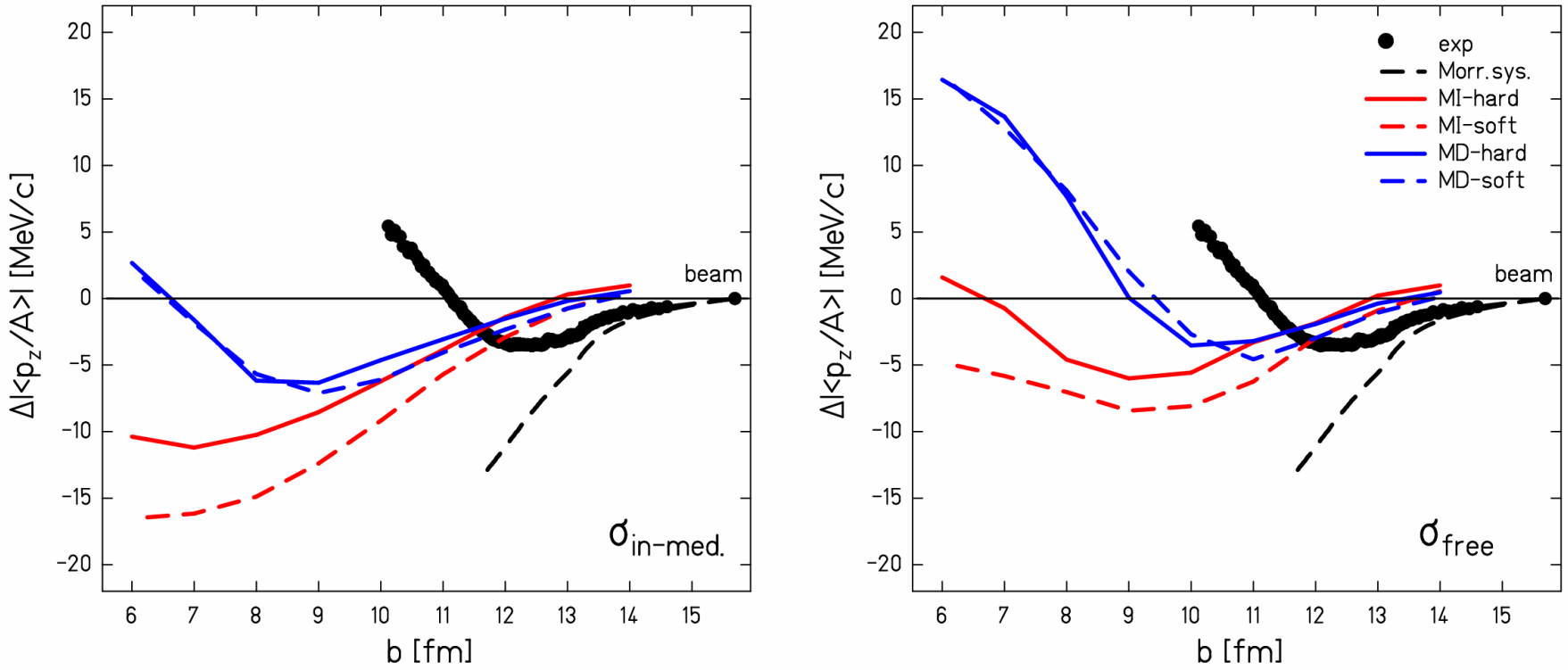

197Au+197Au at 1000 A MeV
197Au+197Au at 500 A MeV
197Au+27Al at 500 A MeV
vpf cm/ns
Ares
2
1
0
−1
−2
20
40
60
80
100
120
140
160
180
200


0.6
0.5
0.4
0.3
0.2
0.1
0.0
−0.1
−0.2
0
20
40
60
80
100
120
140
160
180
200
A_{frag}
$\langle v_z \rangle_{PF}$ [cm.ns^{-1}]
^{197}Au+^{197}Au at 1 A GeV
^{197}Au+^{197}Au at 500 A MeV
^{197}Au+^{27}Al at 500 A MeV
Morr.sys. 1 AGeV
Morr.sys. 0.5 AGeV
beam



Determination of impact parameter (ALADIN data, KAROL + EPAX)

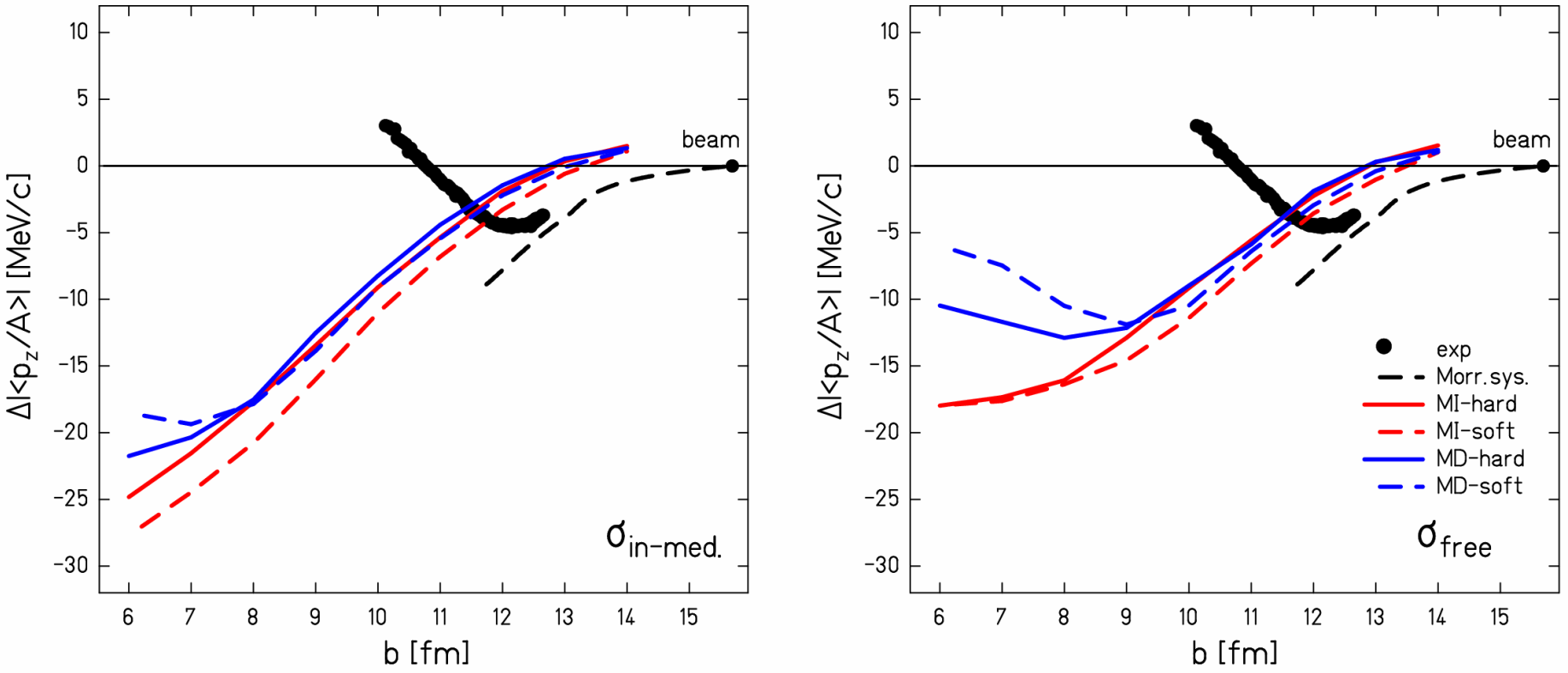
Comparison with BUU calculations



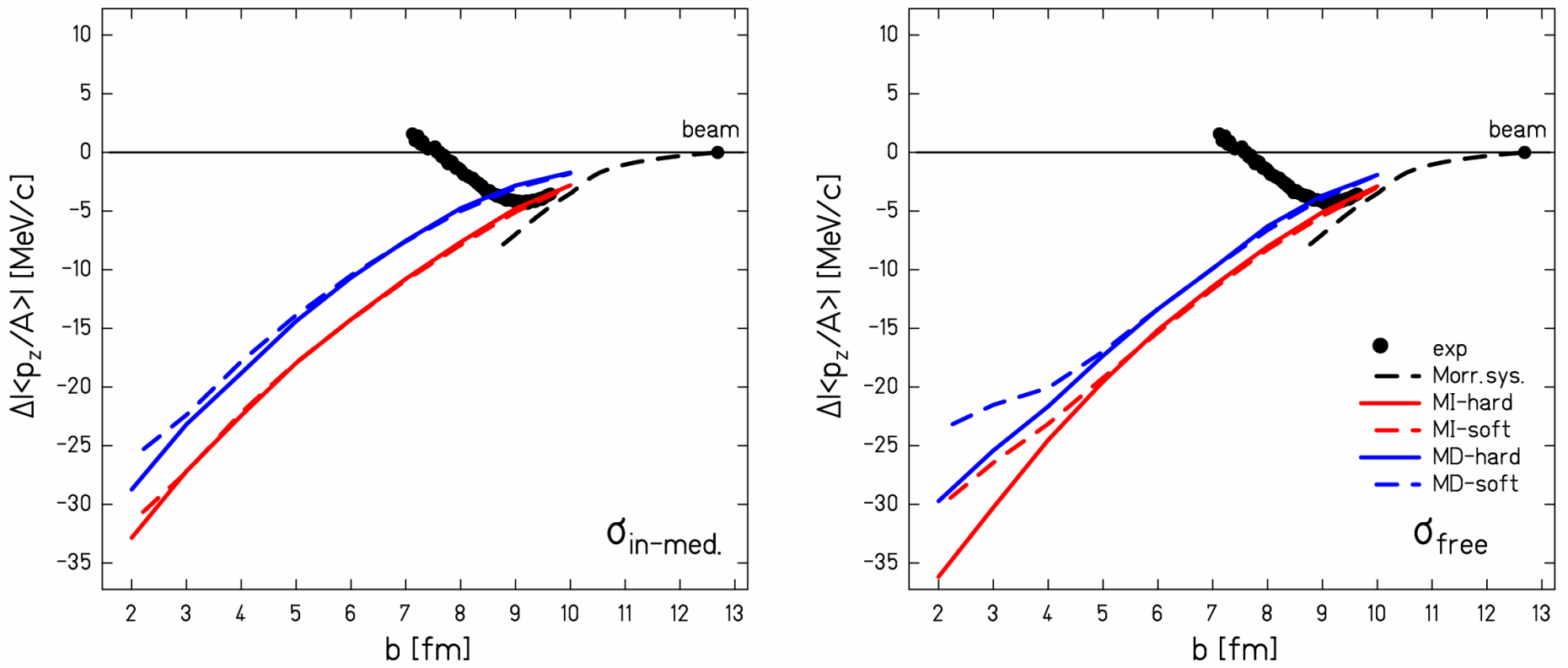
197Au + 197Au, 1 A GeV: Discrepancy in impact parameter

Uncertainties in model parameters? (Nucleon-nucleon cross sections ..)

Comparison with BUU calculations



197Au + 197Au, 500 A MeV: Even stronger discrepancy



179Au + Al, 500 A MeV

Summary

- Variation of re-acceleration with mass and beam energy studied
- Re-acceleration of “light” projectile fragments found to be a rather common phenomenon
- BUU calculations predict re-acceleration only for heavy systems and high beam energies
- Exact origin of re-acceleration unclear:
  - Direct spectator response to the participant blast?
  - Rocket engine ignited by the participant?
- Physical interpretation requires more elaborate model calculations → Information on the property of highly excited nuclear matter!?